THE ACCOUNTING REVIEW

28/11/01

VOLUME 76, No. 1, JANUARY 2001

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The Association between Auditor Litigation and Abnormal Accruals

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The Accounting Review (ISSN 0001-4826) is published four times a year in January, April, July, and October by the American Accounting Association, 5717 Bessie Drive, Sarasota, Florida 34233-2399. General subscriptions are available at the annual rate of U.S. $140; membership subscription rate is $25 with discounts available; and emeritus subscription rate is $8.75. Periodical postage paid at Sarasota, Florida and additional mailing offices. **POSTMASTER:** Send address change to ***The Accounting Review,*** 5717 Bessie Drive, Sarasota, Florida 34233-2399.

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cuk-H01118-25-P010629AC 57R

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On October 30, 2000 Professor Arijit Mukherji passed away in Minneapolis, Minnesota. Ari was 38 years old, was an Associate Professor of Accounting at the Carlson School of Management at the University of Minnesota, and he served as a member of *The Accounting Review*'s editorial board under three consecutive editors. An outstanding classroom instructor, Ari was honored to receive the Carlson Executive M.B.A. program's Lifetime Teaching Award earlier this year. Ari's research spanned theoretical and experimental work in both accounting and economics. The depth and breadth of his knowledge, coupled with his commitment to constructively contribute to the development of others' research, made him one of the most versatile and valuable members of the editorial board. Those of us who had the privilege of knowing Ari and benefiting from his insights will miss him as a scholar, as a colleague, and as a friend.

Ari is survived by his parents, Mr. Prasanta Mukherji and Mrs. Anuradha Mukherji of Calcutta, India, and his sister Kamalika Mukherji and brother-in-law Dr. Sushen Bhattacharya of London, England. Those who wish to express their sympathies to Ari's family, or to contribute to a fund that his friends and colleagues have established, should contact Professor Chandra Kanodia at the University of Minnesota.

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The American Accounting Association (AAA) requests submissions for a special research conference to be held in the winter of 2002 at Emory University on the *Quality of Earnings*. This conference is part of a larger AAA project on earnings quality funded through a grant received by the AAA pursuant to an SEC consent order.

The purpose of the conference is to provide fresh insights into questions of how incentives, judgments, and expertise combine with accounting and auditing standards and securities regulations to affect the quality of reported earnings, and, where possible, to develop the implications of those insights for the key constituencies of financial reporting. The conference will include research on earnings quality and earnings management, broadly construed. Papers using analytical, empirical-archival, experimental, and field study approaches will be considered. Research topics appropriate for this conference include any topic that is consistent with the purpose of the conference. Examples of such topics include, but are not limited to, the following:

1. What are the observable and quantifiable characteristics of higher (or lower) quality earnings? Can specific practices (judgments, estimations, accounting policies, or procedures) be identified which systematically increase or decrease earnings quality?
2. To what extent is earnings quality determined by the applicable financial reporting standards and to what extent is it determined by how the standards are implemented? What are the implications for both domestic and international standard setting, auditing/assurance, and enforcement?
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4. Does the quality of earnings differ systematically across industries (e.g., do so-called "New Economy" firms have systematically higher or lower quality earnings than so-called "Old Economy" firms)?
5. To the extent earnings quality differs across industries, over time, or across jurisdictions, what factors cause these differences? What are the implications for preparers, auditors, investors, standard setters, and securities regulators of over-time shifts in earnings quality, or cross-jurisdictional or industry-specific differences in earnings quality?
6. Do the activities of information intermediaries such as sell-side and buy-side analysts and investment bankers affect earnings quality?
7. To what extent are differences in earnings quality (over time, across jurisdictions, and across industries) due to differences in expertise as opposed to differences in incentives faced by preparers of financial reports and auditors?
8. What is the role of the external auditor in determining the quality of earnings? How does the auditor's expertise interact with incentives, information systems, audit regulations (including independence rules), and the enforcement activities of securities regulators to affect the quality of earnings?

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THE ACCOUNTING REVIEW
Vol. 76, No. 1
January 2001
pp. 1–26

Does the Use of Financial Derivatives Affect Earnings Management Decisions?

Jan Barton
Emory University

ABSTRACT: I present evidence consistent with managers using derivatives and discretionary accruals as partial substitutes for smoothing earnings. Using 1994–1996 data for a sample of *Fortune 500* firms, I estimate a set of simultaneous equations that captures managers' incentives to maintain a desired level of earnings volatility through hedging and accrual management. These incentives include increasing managerial compensation and wealth, reducing corporate income taxes and debt financing costs, avoiding underinvestment and earnings surprises, and mitigating volatility caused by low diversification. After controlling for such incentives, I find a significant negative association between derivatives' notional amounts and proxies for the magnitude of discretionary accruals.

Key Words: *Discretionary accruals, Hedging, Earnings volatility, Income smoothing.*

Data Availability: *Data are available from sources identified in the paper.*

I. INTRODUCTION

Managers are facing increasing pressure to report smooth earnings. According to the CEO of a *Fortune 500* firm, "[t]he No. 1 job of management is to smooth out earnings" (Loomis 1999). Consistent with this view, several academic studies

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This paper is adapted from my Ph.D. dissertation completed at The University of Alabama. I am indebted to Mary Stone (my dissertation advisor), Mary Barth (Associate Editor), Grace Pownall, Steven Schmitt, Greg Waymire, and two anonymous referees for many constructive suggestions. I also thank Bruce Barrett, Robert Brooks, Larry Brown, Harold Elder, Kirsten Ely, Aloke Ghosh, Rob Ingram, Ed Schnee, and seminar participants at The University of Alabama, The University of Arizona, Case Western Reserve University, University of Colorado at Boulder, Baruch College–CUNY, Emory University, Georgia State University, New York University, Northwestern University, Pennsylvania State University, University of Pittsburgh, Tulane University, University of Wisconsin–Madison, and the 1999 Southeastern American Accounting Association Doctoral Consortium for useful comments; John Graham for sharing his marginal tax rates database and helpful discussions; Ron Harris and Lan Wang for research assistance; and The University of Alabama's Graduate Council, the Culverhouse School of Accountancy, and the Goizueta Business School for generous funding. An earlier version of this paper was titled "The Relation between Earnings Management and Risk Management."

Submitted August 1999
Accepted August 2000

document that managers make discretionary accounting choices, in part, to reduce earnings volatility (e.g., Watts and Zimmerman 1986; Subramanyam 1996; DeFond and Park 1997; Myers and Skinner 1999). Indeed, earnings management is believed to be so common that the media and regulators are expressing concern about its effects on the quality of reported earnings and the functioning of capital markets (e.g., Fox 1997; Loomis 1999).

The media, academics, and regulators have focused on discretionary accounting accruals as the primary means by which managers smooth their firms' earnings. However, managers also can smooth earnings by using other tools, such as financial derivatives, that smooth their firms' cash flows. That is, earnings is the sum of cash flows and accruals; all else equal, reducing cash flow volatility should reduce earnings volatility. The purpose of this study is to assess the extent to which managers trade off derivatives and discretionary accruals to control earnings volatility. Because managers can use derivatives to reduce the volatilities of earnings and cash flows caused by fluctuations in interest rates, foreign currency exchange rates, commodity prices, and other risk factors, I expect derivatives and discretionary accruals to serve as partial substitutes for smoothing earnings.

Evidence on the relation between derivative use and accrual management is important because of the controversy surrounding Statement of Financial Accounting Standards (SFAS) No. 133, *Accounting for Derivative Instruments and Hedging Activities* (FASB 1998). Effective for fiscal years beginning after June 15, 2000, this statement requires firms to report derivatives on the balance sheet at fair value, with holding gains and losses included in earnings unless the derivatives meet specific hedge accounting rules. Critics argue that the restrictive nature of these rules will increase earnings volatility and make it more difficult for managers to report smooth earnings (e.g., Osterland 2000). If managers currently use derivatives and discretionary accruals as substitute means of smoothing earnings, then SFAS No. 133 may result in less hedging and more accrual management.

I develop a set of simultaneous equations that captures managers' incentives to maintain a desired level of earnings volatility through hedging and accrual management. These incentives include increasing managerial compensation and wealth, reducing corporate income taxes and debt financing costs, avoiding underinvestment and earnings surprises, and mitigating volatility caused by low diversification. The simultaneous equations correct for self-selection because only approximately three-fourths of my sample firms use derivatives, and each factor behind the decision to use derivatives may have a different effect on the magnitude of the derivatives used (e.g., Allayannis and Ofek 2000; Haushalter 2000). This approach allows me to examine the relation between derivatives and discretionary accruals once the firm has set up its risk management program. I measure derivatives using notional amounts and discretionary accruals using the modified Jones (1991) model. I estimate the simultaneous equations using 1994–1996 data for a sample of nonfinancial, nonregulated *Fortune 500* firms.

Consistent with my expectations, the empirical results show that firms holding derivative portfolios with large notional amounts also have lower absolute levels of discretionary accruals, suggesting that derivatives and discretionary accruals are partial substitutes for smoothing earnings. Although I cannot rule out that managers choose derivatives and discretionary accruals sequentially, I find that these tools are endogenous and primarily the result of a joint decision to manage risk and earnings.

My study extends and integrates two distinct lines of research. The first line examines the tradeoffs managers make between discretionary accounting choices and "real" transactions when managing their firms' financial reports. This research generally allows accounting choices and other transactions to be determined endogenously (e.g., Beatty et al.

1995; Hunt et al. 1996; Gaver and Paterson 1999), but rarely examines cash flow management as a mechanism to smooth earnings. I contribute to this line of research by showing that derivatives not only reduce earnings volatility directly by affecting cash flows, but also indirectly by affecting accruals.

The second line of research examines the tradeoffs managers make between derivatives and other risk management tools. For example, Schrand and Unal (1998) find that managers of thrift institutions combine derivatives and the composition of loan portfolios to manage overall risk. Three recent working papers report similar tradeoffs in other industries: Ahmed et al. (1998) in banking, Petersen and Thiagarajan (2000) in gold mining, and Rajgopal and Pincus (2000) in oil and gas production. Because each of these studies focuses on a single industry, each is restricted by necessity to a small sample of firms—for example, Petersen and Thiagarajan's sample includes only two firms. My paper contributes to this line of research by examining in a larger cross-section of firms the interaction between derivatives and a different tool—discretionary accruals.

This paper has implications for research on earnings management and accounting policy choice because it suggests that managers of a broad cross-section of firms make accounting and risk management decisions jointly. Because accrual management and cash flow management are interrelated, research that overlooks this relation risks drawing inappropriate inferences about managers' financial reporting decisions.

Section II describes the sample and proxies for derivative use and accrual management. Section II also reports empirical evidence on how derivatives and discretionary accruals affect earnings volatility. Section III develops the hypothesis that derivatives and discretionary accruals are substitute tools for smoothing earnings. Sections IV, V, and VI describe the research design, primary empirical results, and sensitivity tests, respectively. Finally, Section VII offers some concluding remarks.

II. SAMPLE AND MEASUREMENT OF DERIVATIVE USE AND ACCRUAL MANAGEMENT

Sample

My sample consists of nonfinancial, nonregulated *Fortune 500* firms for 1994–1996, after discarding firms that were merged or acquired, were owned privately or by foreign corporations, or had missing data. It includes three annual observations for 304 firms—218 derivative users and 86 nonusers. Firms that use derivatives do so consistently throughout the sample period. Table 1 summarizes the sample's composition.

Two aspects of the sample should increase the power of my tests. First, SFAS No. 119, *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments* (FASB 1994), was in effect during the sample period. SFAS No. 119 expanded the disclosed data on derivatives by requiring firms to distinguish between derivatives used for hedging and those used for trading or speculating, and by restricting the aggregation and netting of derivatives' notional amounts and fair values. The expanded disclosures allow me to measure more accurately derivatives used for hedging. Second, *Fortune 500* firms tend to have large levels of assets, debt, cash flows, sales, and foreign operations, likely rendering derivatives a feasible alternative to accruals for managing earnings volatility.

Measuring Derivative Use

The best measure of a firm's hedging is the ratio of the derivative position to the amount of risk exposure the firm is trying to hedge (e.g., Tufano 1996). Unfortunately, most sample

TABLE 1
Sample Selection and Composition

Panel A: Sample Selection

Firms consistently included in *Fortune 500* lists during 1994–1996	489
Less: Firms privately owned, foreign-owned, or with missing information	(82)
Less: Firms in financial services or regulated industries	(103)
Total firms in sample	304
Less: Firms not using financial derivatives	(86)
Firms using financial derivatives	218

Panel B: Sample Composition by Industry

Industry	*Firms*	*Percent*
Consumer goods	33	10.9
Electronics, electrics, and semiconductors	35	11.5
Energy	18	5.9
Metals	14	4.6
Nondurable consumer products	10	3.3
Paper and related products	19	6.3
Production and construction materials	21	6.9
Transportation	49	16.1
Merchandising, retail, and wholesale	57	18.8
Services	48	15.7
Total firms in sample	304	100.0

firms do not disclose enough information to calculate this ratio.[1] Instead, I measure derivative use (DERIVATIVES) as the disclosed notional amount of interest rate and foreign currency derivatives, scaled by lagged total assets.[2] Although a derivative's notional amount is usually much larger than its fair value, it is nonetheless a viable measure of hedging because it represents (1) the amount exposed to changes in the value of the underlying, and (2) the basis for calculating the amounts exchanged by the parties to the derivative (e.g., Guay 1999; Allayannis and Ofek 2000; Haushalter 2000).

---

[1] Most sample firms meet the requirements of SFAS No. 119 by stating that their derivatives' carrying amounts approximate their fair values without disclosing either. Moreover, because SFAS No. 119 does not require it, most firms do not disclose quantitative information about their risk exposures.

[2] Panel A of Table 2 shows that only 14 percent of derivative users in my sample have commodity contracts. SFAS No. 119 does not require firms to disclose information about contracts that either call for the exchange of a financial instrument for a nonfinancial commodity or that permit the settlement of an obligation by delivery of a nonfinancial commodity. Therefore, most sample firms do not disclose fair values, carrying amounts, or notional amounts for commodity derivatives. DERIVATIVES thus excludes commodity notional amounts.

Panel A of Table 2 reports sample firms' descriptive statistics, including their derivative positions. Derivatives data come from 1994–1996 Form 10-K filings retrieved from EDGAR; the remaining data come from Compustat. Seventy-two percent of the firms use derivatives, with mean and median notional amounts of \$2.5 billion and \$0.5 billion. Reported fair values and carrying amounts average about 6 percent or less of notional amounts.

To assess whether derivatives' notional amounts capture basic attributes of hedging, I correlate DERIVATIVES with three rough proxies for hedge ratios constructed from publicly available data: the ratios of foreign currency notionals to foreign sales, interest rate notionals to total debt, and commodity notionals to total sales. Panel B of Table 2 displays a strong positive correlation between DERIVATIVES and these proxies, suggesting that DERIVATIVES does in fact capture basic attributes of hedging. Panel B also shows that DERIVATIVES is strongly correlated with two other measures of derivative use: fair values and carrying amounts, both scaled by lagged assets.

Measuring Accrual Management

Discretionary accruals are unobservable, so I use the Jones (1991) accruals expectation model as modified by Dechow et al. (1995) to develop a proxy:[3]

$$\begin{aligned} TAC_{it}/TA_{it-1} = {} & \phi_1(1/TA_{it-1}) + \phi_2[(\Delta REV_{it} - \Delta REC_{it})/TA_{it-1}] \\ & + \phi_3(PPE_{it}/TA_{it-1}) + \varepsilon_{it}, \end{aligned} \tag{1}$$

where TAC is total accruals, which I measure as earnings before extraordinary items and discontinued operations less operating cash flows (see Collins and Hribar 1999);[4] TA is total assets; ΔREV is change in revenue; ΔREC is change in accounts receivable; and PPE is gross property, plant, and equipment. The (ΔREV − ΔREC) term controls for normal levels of working capital accruals related to sales, the PPE term controls for normal levels of depreciation expense and related deferred tax accruals, and the TA deflator controls for potential scale bias (Jones 1991; Dechow et al. 1995).

To avoid unnecessary sample attrition, I estimate equation (1) cross-sectionally for each sample year and two-digit SIC code using ordinary least squares regression. I proxy for discretionary accruals by the regression residuals. Because my arguments and tests are based on theories of income smoothing rather than on theories of directional earnings management, I am interested in the magnitude, not the direction, of discretionary accruals. Therefore, my analysis is based on the absolute value of the proxy for discretionary accruals (|DAC|).

Effects of Derivative Use and Accrual Management on Earnings Volatility

The next section (Section III) will develop the hypothesis that derivatives and discretionary accruals are partial substitutes for smoothing earnings. The hypothesis assumes that managers use these tools to smooth earnings. Thus, I first provide empirical evidence supporting this assumption.

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[3] Although this is the most powerful accruals expectation model available in the current literature, it estimates discretionary accruals with considerable imprecision (e.g., Dechow et al. 1995; Guay et al. 1996). Section VI assesses the impact that measurement error in discretionary accruals may have on my inferences.

[4] I do not adjust for accruals resulting from deferred gains and losses on derivatives because only about half of the derivative users in my sample disclose this information. For these firms, Panel A of Table 2 shows that the magnitude of the deferred items, as a percentage of either total accruals or total notional amount, is immaterial.

TABLE 2
Sample Descriptive Statistics and Correlations among Measures of Derivative Use

Panel A: Descriptive Statistics for Sample Firm-Years[a]

Variable	*n*	*Mean*	*Standard Deviation*	*First Quartile*	*Median*	*Third Quartile*
Market capitalization	912	10,976	17,594	2,087	4,534	11,029
Total assets	912	11,730	24,925	2,702	5,200	12,346
Sales	912	11,256	16,989	3,651	6,391	12,219
Net income	912	576	1,049	98	248	646
Total accruals	912	−621	1,429	−634	−221	−69
Derivatives:						
Notional amount	654	2,452	9,138	178	530	1,688
Foreign exchange	461	1,541	3,781	112	390	1,200
Interest rate	462	1,758	7,282	171	390	1,219
Commodity	88	220	392	9	53	180
Carrying amount	270	25	55	0	3	21
Carrying amount/notional amount	270	2.8%	6.6%	0.0%	0.6%	2.3%
Fair value	346	125	331	1	18	75
Fair value/notional amount	346	6.3%	22.3%	0.9%	2.3%	6.1%
Deferred gain (loss)	357	−2	25	0	0	0
Deferred gain (loss)/notional amount	357	0.0%	0.9%	0.0%	0.0%	0.0%
Deferred gain (loss)/total accruals	357	0.7%	2.3%	0.0%	0.0%	0.0%

(*Continued on next page*)

TABLE 2 (Continued)

Panel B: Rank Correlations between DERIVATIVES and Other Measures of Derivative Use

	Sample of Firm-Years Used to Estimate Correlation			
Variable	*All Users*	*Foreign Currency Derivative Users Only*	*Interest Rate Derivative Users Only*	*Commodity Derivative Users Only*
Foreign currency derivatives' notional amount/foreign sales		0.507*** (n = 461)		
Interest rate derivatives' notional amount/total debt			0.746*** (n = 462)	
Commodity derivatives' notional amount/total sales				0.192** (n = 88)
Total derivatives' fair value/ lagged total assets	0.625*** (n = 346)	0.440*** (n = 254)	0.600*** (n = 245)	0.703*** (n = 48)
Total derivatives' carrying amount/ lagged total assets	0.591*** (n = 270)	0.486*** (n = 183)	0.524*** (n = 192)	0.627*** (n = 36)

** and *** denote significance at the 0.05 and 0.01 levels, respectively, based on two-tailed tests.

[a] Amounts other than percentages and firm-years are in $ millions.

DERIVATIVES is the notional amount of interest rate and foreign currency derivatives, scaled by lagged total assets.

Earnings is the sum of cash flows and accruals; hence, the variance of earnings (σ_E^2) is a function of the variance of cash flows (σ_C^2), the variance of accruals (σ_A^2), and the correlation between cash flows and accruals (ρ_{CA}):

$$\sigma_E^2 = \sigma_C^2 + \sigma_A^2 + 2\ \rho_{CA}\ \sigma_C\ \sigma_A. \tag{2}$$

Therefore, managers can change earnings volatility by adjusting cash flow volatility, accrual volatility, and/or the correlation between cash flows and accruals.

To assess whether managers use derivatives and accruals to smooth earnings, I correlate each sample firm's earnings volatility (and the cash flow and accrual components shown in equation (2)) with that firm's mean DERIVATIVES and |DAC| for the sample period. To mitigate possible scale bias, I measure volatility using the coefficient of variation in the firm's quarterly earnings, cash flows, and accruals.

Before proceeding, I should note two points. First, unlike accruals, derivatives directly affect the volatility of cash flows. Therefore, I expect managers to use derivatives to reduce the volatility of their firms' cash flows, which should result in a negative relation between DERIVATIVES and cash flow volatility. In contrast, I do not expect |DAC| to be directly associated with less volatile cash flows. Second, a firm that successfully manages derivatives and discretionary accruals to reduce the volatility of its earnings (and components of earnings) will have a negative within-firm relation between earnings volatility on one hand, and DERIVATIVES and |DAC| on the other. However, this negative within-firm relation may be masked in a cross-sectional analysis. If firms with more volatile (premanaged) earnings tend to use more derivatives and discretionary accruals to manage this higher volatility, a cross-sectional analysis may even show a positive relation between volatility and the earnings-smoothing tools, thereby masking a negative within-firm relation.

Panel A of Table 3 reveals that, for firms in my sample, earnings is less volatile than cash flows, and that accruals are negatively correlated with cash flows. The first column of Panel B of Table 3 shows that DERIVATIVES is negatively associated with the volatilities of earnings, cash flows, and accruals. These results are consistent with managers using derivatives to reduce the volatilities of cash flows and accruals, which in turn reduces the volatility of earnings.

The second column of Table 3, Panel B shows that |DAC| is not significantly associated with earnings volatility, and that it is positively associated with cash flow volatility and accrual volatility. Recall, however, that accrual management does not affect cash flow volatility directly, so these results suggest that firms with high cash flow volatility manage accruals to a greater extent. In other words, the results most likely reflect the cross-sectional rather than the within-firm effect noted above. For example, untabulated results indicate that |DAC| is positively associated (rank correlation 0.143, $p = 0.014$) with the ratio of premanaged earnings volatility (i.e., reported earnings minus the proxy for discretionary accruals) to reported earnings volatility. Large values of this "smoothing ratio" indicate that discretionary accruals smoothed earnings, so the significant positive association between |DAC| and the "smoothing ratio" implies that the larger the absolute value of discretionary accruals, the lower the volatility of reported earnings.[5] Taken together, this evidence is consistent with managers of firms with more volatile cash flows manipulating

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[5] Unlike the coefficient of variation of earnings, the "smoothing ratio" compares premanaged earnings to reported earnings and, therefore, directly captures the within-firm effect of accrual management. Because |DAC| proxies for the magnitude, not the direction, of accrual management, the negative association between |DAC| and the "smoothing ratio" is not mechanical.

TABLE 3
Analysis of the Effects of Derivative Use and Accrual Management on Volatility

Panel A: Descriptive Statistics for Volatility Measures (n = 304)

Variable	*Mean*	*Standard Deviation*	*First Quartile*	*Median*	*Third Quartile*
Coefficient of variation of:[a]					
Earnings	1.048	4.316	0.329	0.613	1.433
Operating cash flows	1.876	4.766	0.583	0.773	1.513
Total accruals	2.833	8.537	0.752	0.985	1.707
Correlation between					
operating cash flows and total accruals	−0.641	0.517	−0.986	−0.896	−0.515

Panel B: Rank Correlations between DERIVATIVES and |DAC| and the Volatility Measures[b]

Variable	*DERIVATIVES (n = 218)*	*|DAC| (n = 304)*
Coefficient of variation of:[a]		
Earnings	−0.140**	0.033
Operating cash flows	−0.119*	0.291***
Total accruals	−0.123*	0.183***
Correlation between		
operating cash flows and total accruals	−0.013	−0.174***

*, **, and *** denote significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

[a] The coefficient of variation is the standard deviation of the variable divided by the absolute value of its mean, based on quarterly data for 1994–1996.

[b] Correlations are partial after controlling for industry membership. Correlations with DERIVATIVES are based on the sample of derivative users only, whereas correlations with |DAC| are based on the entire sample.

DERIVATIVES is the notional amount of foreign currency and interest rate derivatives, scaled by lagged total assets. |DAC| is the absolute value of discretionary accruals, i.e., regression residuals from equation (1).

accruals to a greater extent. Further, the negative correlation between the magnitude of discretionary accruals and the correlation between cash flows and total accruals (i.e., the last term in equation (2)) reported in Panel B of Table 3 suggests that the more effective accruals are at offsetting cash flows, the greater the extent to which discretionary accruals are managed.

III. THE RELATION BETWEEN DERIVATIVE USE AND ACCRUAL MANAGEMENT

In the previous section, I provided evidence that managers use derivatives and discretionary accruals to smooth earnings. In this section, I develop the hypothesis that managers use these tools as substitute means of smoothing earnings. Consider a firm whose capital structure consists entirely of variable-rate debt. Accordingly, its cash flows and earnings are exposed to interest rate risk: unexpected increases (decreases) in interest rates increase (decrease) the firm's interest expense and reduce (increase) its cash flows and earnings, thus increasing volatility. Consistent with the evidence presented in Panel B of Table 3, assume that the firm's manager uses derivatives and discretionary accruals to mitigate the effects of interest rate risk on earnings volatility.[6] Assume further that she wants to maintain an optimal level of earnings volatility. This level is likely nonzero because (1) derivative use and accrual management are both costly activities, and (2) some volatility, such as that stemming from core business risk, may actually be desirable (see Schrand and Unal 1998).

Suppose this manager hedges a portion of the outstanding debt with a pay-fixed/receive-variable interest rate swap.[7] When interest rates fall below (rise above) the fixed rate stated in the swap, the firm pays the shortfall to (collects the excess from) the counterparty and adjusts its interest expense to reflect the payment (collection). The swap decreases cash flow volatility by effectively converting a portion of the variable-rate debt into fixed-rate debt. Accrual volatility remains unchanged as long as the net interest expense is paid when incurred (or decreases if it is accrued and paid in a subsequent period). Thus, the net effect of the swap is to smooth earnings and cash flows.

Exposures are seldom hedged perfectly, so the swap might not eliminate cash flow volatility altogether. The smaller the portion of interest rate risk hedged with derivatives, the larger the portion of risk available to be mitigated with discretionary accruals. This leads to the hypothesis that derivatives and discretionary accruals serve as partial substitutes for smoothing earnings. Substitution implies, for example, that if using derivatives becomes more costly, less efficient, or less effective than managing accruals, then the manager will decrease her use of derivatives and increase her use of discretionary accruals to mitigate earnings volatility. The empirical implication of this tradeoff is that, conditional on the manager's target level of earnings volatility, the notional amount of derivatives should be negatively associated with the absolute value of discretionary accruals.

Managers presumably consider using derivatives and discretionary accruals jointly if the costs or effectiveness of these tools differ. In other words, the extent to which managers use derivatives vis-à-vis discretionary accruals is likely endogenous. Assuming that managers use these tools to maintain an optimal level of earnings volatility, I predict and test the following alternative hypothesis:

> **H_a:** DERIVATIVES and |DAC| will be negatively associated, conditional on managers' maintaining a desired level of earnings volatility.

I predict this negative association only at the margin, however. If managers use both derivatives and accruals to smooth earnings, it would not be surprising to find a positive empirical association between notional amounts and the magnitude of discretionary accruals. In fact, for derivative users in my sample, the rank correlation between DERIVATIVES and |DAC| is 0.113 ($p = 0.004$). This simple correlation, however, is misleading because it ignores factors that determine managers' desired levels of earnings volatility. The research design I describe in the next section controls for these factors.[8]

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[6] Other risk management tools may be available (e.g., insurance contracts for casualty risk, derivatives and collateralization for credit risk, and diversification for overall business risk). Because of data limitations, my empirical analysis controls only for diversification.

[7] The hypothesis I develop in this section also holds, for instance, if the firm has fixed-rate debt and enters into a pay-variable/receive-fixed interest rate swap (i.e., when the firm enters into a fair value hedge rather than a cash flow hedge).

[8] Also, H_a holds only if managers use derivatives to *reduce* overall cash flow volatility. If managers use derivatives to *increase* overall cash flow volatility (e.g., because of hedging ineffectiveness or speculation), then they may have to manage accruals to a greater extent to smooth earnings. In this case, the magnitudes of derivatives and discretionary accruals will be *positively* correlated—that is, derivatives and discretionary accruals will be *complements*. Complementarity is not a concern in my analysis because, as Table 3 shows, DERIVATIVES is negatively associated with cash flow volatility, consistent with managers using derivatives to reduce overall volatility.

IV. EMPIRICAL DESIGN

To test H_a, I use the following simultaneous equations:

$$\text{DERIVATIVES}_{it} = \alpha_0 + \alpha_1|\text{DAC}|_{it} + \boldsymbol{\alpha}'\textbf{CONTROLS}_{it} + \zeta_{it} \tag{3}$$

and

$$|\text{DAC}|_{it} = \beta_0 + \beta_1\text{DERIVATIVES}_{it} + \boldsymbol{\beta}'\textbf{CONTROLS}_{it} + \xi_{it}, \tag{4}$$

where DERIVATIVES and |DAC| are defined as in Section II and **CONTROLS** is a vector of control variables that I describe shortly.

I embed in the simultaneous equations a correction for self-selection because only about 72 percent of my sample firms report using derivatives, and each factor behind the decision to use derivatives may have a different effect on the magnitude of the derivatives used (see Cragg 1971; Allayannis and Ofek 2000; Haushalter 2000). I first estimate the following equation to explain the decision to use derivatives:

$$\text{USER}_{it} = \gamma_0 + \boldsymbol{\gamma}'\textbf{CONTROLS}_{it} + \nu_{it}, \tag{5}$$

where USER is coded 1 if the firm uses derivatives, 0 otherwise. I use probit regression on the full sample of 912 firm-years to estimate equation (5). I then obtain z_{it}, the fitted value of the probit regression index function, and calculate inverse Mills ratios (MILLS), i.e., $\phi(z_{it})/\Phi(z_{it})$, where ϕ is the standard normal density and Φ is the normal cumulative probability. I include MILLS as an additional control variable to correct for potential self-selection bias in the simultaneous equations (3) and (4), which I estimate using only the sample of derivative users. Together, equations (3)–(5) form a self-selection simultaneous-equations model.

H_a predicts that the coefficients of DERIVATIVES and |DAC| will be negative. Because these coefficients are conditional on the firm's decision to use derivatives, they capture the ongoing relation between derivative use and accrual management once the firm has set up its risk management program.

The vector **CONTROLS** accounts for managers' incentives to use derivatives and manage accruals to maintain a desired level of earnings volatility. It includes two sets of variables, one common to all equations and the other intended to identify the simultaneous equations. Unless otherwise indicated, the data I use to construct these variables come from Compustat.

Variables Common to All Equations

The literature suggests that managers use derivatives and discretionary accruals to increase managerial compensation and wealth, to reduce income taxes and debt financing costs, to avoid underinvestment and earnings surprises, and to mitigate any volatility caused by low diversification. Equations (3)–(5) include variables to control for these incentives, as well as industry and year indicators to control for industry-specific and time-varying economic factors.

Managers have incentives to manage earnings volatility to increase their cash compensation (i.e., salary and bonus) and the value of their stock and stock options. Because cash compensation and firm value tend to increase with earnings persistence (e.g., Baber et al. 1998; Barth et al. 1999; Myers and Skinner 1999), managers are likely to smooth earnings through derivatives and discretionary accruals to increase their compensation and the value of their stock (e.g., Smith and Stulz 1985; Gaver et al. 1995; Balsam 1998). The incentives to manage earnings volatility to increase the value of stock options are less clear. Under standard option pricing models, the value of a call option increases in both the level and volatility of the firm's stock price. If stock options are more sensitive to the level (volatility) of stock prices, managers may be inclined to reduce (increase) earnings volatility. I expect cash compensation and stock holdings to be positively associated with derivative use and accrual management, but I make no prediction for stock options. Using data from ExecuComp, I measure cash compensation (CASH_COMP) as the CEO's salary and bonus, stock holdings (STOCK) as the fair value of stock he or she owns, and option holdings (OPTIONS) as the number of options he or she has outstanding. I scale these variables by lagged assets.

If the firm's income taxes are a convex function of taxable income (i.e., marginal tax rates exceed average tax rates), smoothing taxable income can lower expected taxes (Smith and Stulz 1985; Graham and Smith 1999).[9] Although taxable income generally differs from (financial accounting) earnings, it includes both accrual basis components—generally measured under GAAP—and cash basis components, so smoothing earnings and cash flows presumably smoothes taxable income. I expect tax convexity (CONVEXITY) to be positively associated with derivative use and accrual management, and I compute it as the excess of the marginal tax rate (calculated as in Graham [1996]) over the average tax rate (calculated as tax expense divided by pretax earnings).

Highly levered and financially distressed firms can reduce debt financing costs by smoothing earnings to reduce creditors' perception of firm risk (e.g., Smith and Stulz 1985). Moreover, smoothing earnings can both free up potentially binding debt covenants (Smith and Stulz 1985; Watts and Zimmerman 1986) and increase debt capacity (e.g., Leland 1998; Graham and Rogers 2000). Therefore, I expect leverage and financial distress to be positively associated with derivative use and accrual management. I proxy for leverage (LEVERAGE) using the debt-to-asset ratio and for financial distress (DISTRESS) using Ohlson's (1980) bankruptcy prediction model.

Firms with growth options such as R&D are more likely to smooth earnings and cash flows to avoid underinvestment. For example, under current GAAP, R&D investments are expensed when incurred. Therefore, when pre-R&D earnings are low, managers may underinvest in R&D (Baber et al. 1991). I expect R&D intensity (RD) to be positively associated with derivative use and accrual management, and I measure it by the ratio of R&D expense to sales. To the extent that managers must rely on external funding, smoother earnings and cash flows can also prevent underinvestment by lowering the costs of debt and equity financing (e.g., Froot et al. 1993; Géczy et al. 1997; Minton and Schrand 1999; Graham and Rogers 2000). Therefore, I also expect the interaction between RD and LEVERAGE to be positively associated with derivative use and accrual management (see Géczy et al. 1997; Graham and Rogers 2000).

Firms with heavy analyst following face pressure to smooth earnings so as to avoid reporting earnings surprises (Johnson 1999). Investors value at a premium firms with smooth, steadily increasing earnings and penalize firms that either break this pattern (Barth et al. 1999; Myers and Skinner 1999) or miss analysts' forecasts (e.g., Skinner and Sloan

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[9] Convexity in the tax function results from progressive statutory tax rates and tax preference items or tax shields such as net operating loss carryforwards, tax credits, and other permanent or temporary differences between financial and tax accounting. Firms facing linear tax functions would not benefit from smoothing taxable income. Firms facing concave tax functions would benefit from increasing taxable income volatility, but Graham and Smith (1999) show that such benefits are rather immaterial.

1999). Therefore, I expect analyst following (ANALYSTS) to be positively associated with derivative use and accrual management. I measure analyst following as the logarithm of the number of analysts following the firm, obtained from Bloomberg.

Finally, less diversified firms are more likely to use derivatives and manage accruals because they lack naturally smooth earnings and cash flows (Smith and Stulz 1985). However, firms diversifying internationally are exposed to foreign exchange rate risk and are more likely to benefit from using foreign currency derivatives (e.g., Géczy et al. 1997; Allayannis and Ofek 2000) and discretionary accruals. I expect business diversification (DIVERSIFICATION) to be negatively associated with derivative use and accrual management, and I measure it using the entropy index of business segment sales (Palepu 1985). On the other hand, I expect exposure to foreign exchange rate risk to be positively associated with derivative use and accrual management, and I proxy it by the ratio of foreign to total sales (FRGN_SALES).

Variables to Identify the Simultaneous Equations

I include in the DERIVATIVES equation (3) variables to control for firm size, dividend yield, debt maturity, and cash cycle. Because these variables explain the use of derivatives, I also include them in the USER equation (5). Larger firms with scale economies are more likely to find derivatives to be cost effective (e.g., Tufano 1996; Géczy et al. 1997; Allayannis and Ofek 2000), so I expect firm size (SIZE) to be positively associated with derivative use. I measure firm size as the logarithm of the sum of total liabilities, preferred stock, and market capitalization of common stock. Large expected dividend yields increase the firm's cash needs, giving its managers further incentives to hedge (e.g., Graham and Rogers 2000). I expect dividend yield (DIV_YIELD) to be positively associated with derivative use, and I measure it as the ratio of cash dividends to market capitalization of common stock. Firms with shorter debt maturity are more likely to use interest rate swaps (e.g., Visvanathan 1998), so I expect short maturity debt (ST_DEBT) to be positively associated with derivative use. I define ST_DEBT as the ratio of short-term debt to total debt. Finally, firms with long cash conversion cycles are more likely to benefit from hedging because their cash flows are exposed to fluctuations in market prices for a longer period. For example, the longer foreign currency denominated accounts receivable remain outstanding, the more volatile their dollar value will be. I expect cash cycle (CASH_CYCLE) to be positively associated with derivative use, and I measure it as the number of days that inventory is in stock plus the number of days that receivables (net of payables) are outstanding.

I include in the |DAC| equation (4) variables to control for accrual reversals, LIFO reserve, dividend paycut rate, industry flexibility to manage accruals, and extreme cash flow performance. Due to the reversing nature of accruals, managers who manipulate accruals in one period will have to manipulate accruals in subsequent periods to achieve the same level of earnings, all else equal (e.g., Hunt et al. 1996). Therefore, I expect |DAC| to be positively autocorrelated and include its lagged value, $|DAC|_{t-1}$, in equation (4).[10] The larger the beginning LIFO reserve, the greater managers' ability to increase income by liquidating LIFO layers (e.g., Hunt et al. 1996), so I expect the beginning LIFO reserve scaled by lagged assets (LIFO_RESERVE) to be positively associated with accrual management. Managers can achieve expected dividend payout rates and distribute less cash by adjusting accruals to reduce earnings. Therefore, I expect the divided payout rate based on *premanaged* earnings to be negatively associated with accrual management. I measure this rate (DIV_PAYOUT) by the ratio of cash dividends to earnings net of discretionary accruals. Managers in industries with more flexible GAAP are likely to manage accruals to a greater extent, so I expect industry flexibility to be positively associated with the magnitude of discretionary accruals. I proxy for flexibility (FLEXIBILITY) by the root mean squared error of the regression used to estimate the firm-year's discretionary accruals.[11] Finally, the modified Jones (1991) model overstates the magnitude of discretionary accruals for firms with extreme operating cash flows (Dechow et al. 1995). To control for this measurement problem, I include the absolute value of operating cash flows scaled by lagged assets (|OCF|), and I expect it to be positively associated with |DAC|.

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[10] Untabulated analyses reveal that the time-series of both discretionary accruals and their absolute values exhibit positive autocorrelation coefficients ranging from 0.290 to 0.351.

Panel A of Table 4 reports descriptive statistics for the control variables. Panel B shows rank correlations between the endogenous and control variables. In general, the correlations are consistent with my expectations in that most variables that capture incentives to use derivatives and manage accruals are significantly correlated with USER, DERIVATIVES, and/or |DAC|. Moreover, the identifying variables are generally not significantly correlated with the dependent variables of the equations they identify.

V. EMPIRICAL RESULTS

Table 5 reports summary statistics for the estimated regressions. Recall that the USER equation (5) describes managers' decision whether to use derivatives, whereas the DERIVATIVES and |DAC| equations (3) and (4) describe the magnitudes of derivatives and discretionary accruals, respectively, once managers have chosen to use derivatives. I first present probit regression results for the USER equation estimated on the entire sample. Next, I present two-stage least squares (2SLS) regression results for the DERIVATIVES and |DAC| equations estimated only on the sample of derivative users. I use 2SLS because the system is overidentified. To help interpret the relative importance of each right-hand-side variable in explaining variation in the dependent variables, I report marginal probabilities for the USER equation and standardized coefficients for the DERIVATIVES and |DAC| equations. I also downweigh the effects of influential observations using the procedures described in Li (1985).[12] The test statistics for all coefficients are heteroscedasticity-consistent and adjusted for residual correlation among the three time-series observations of each firm.

Table 5 shows that the coefficients of DERIVATIVES and |DAC| are both negative and significant. These results support H_a. Further, Hausman (1978) tests indicate that DERIVATIVES and |DAC| are endogenous. Taken together, the results suggest that derivatives and discretionary accruals are partial substitutes for smoothing earnings, and that their magnitudes are determined jointly.

The coefficients of the control variables in the USER equation (3) differ from those in the DERIVATIVES equation (4), which justifies modeling separately the decision to use derivatives and the magnitude of derivatives used. For example, SIZE is positively associated with USER but not with DERIVATIVES, suggesting that larger firms are more likely to use derivatives but, once they do, their size has no effect on how much they hedge.

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[11] The root mean squared error is the square root of the sum of the squared residuals from the regression of equation (1) for each two-digit SIC industry, scaled by the appropriate number of degrees of freedom. Because the residuals proxy for discretionary accruals, industries in which firms have larger (absolute) residuals also have larger values of FLEXIBILITY. I use FLEXIBILITY as a proxy for the extent of discretion exercised by firms in a particular industry. If the regression residuals proxy for discretionary accruals with error, FLEXIBILITY can also be viewed as a control for such measurement error.

[12] Close inspection of influential observations indicates that they are not miscoded. Therefore, I retain these observations but reduce their influence using bounded influence estimation.

The results reported in Table 5 provide further insight into how managers of firms that use derivatives might combine risk and earnings management strategies to achieve their goals. For instance, CASH_COMP is positively associated with |DAC|. Contrary to my expectations, it is not associated positively with either USER or DERIVATIVES. On the other hand, STOCK and OPTIONS are positively associated only with DERIVATIVES. Taken together, these results are consistent with managers adjusting accruals to increase

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TABLE 4
Descriptive Statistics for Control Variables and Rank Correlations between Control and Endogenous Variables

Panel A: Descriptive Statistics for Control Variables (n = 912)

Control Variable	*Mean*	*Standard Deviation*	*First Quartile*	*Median*	*Third Quartile*
CASH_COMP	0.391	0.325	0.144	0.303	0.532
STOCK	0.591	1.531	0.010	0.039	0.181
OPTIONS	0.195	0.489	0.000	0.000	0.056
CONVEXITY	0.018	0.051	0.000	0.000	0.000
LEVERAGE	0.413	0.220	0.258	0.404	0.556
DISTRESS	0.123	0.135	0.037	0.081	0.154
RD	0.017	0.030	0.000	0.000	0.019
RD × LEVERAGE	0.005	0.010	0.000	0.000	0.007
ANALYSTS	3.211	0.805	2.996	3.401	3.738
DIVERSIFICATION	0.422	0.506	0.000	0.100	0.790
FRGN_SALES	0.187	0.206	0.000	0.134	0.343
SIZE	9.130	1.181	8.370	8.993	9.904
DIV_YIELD	0.021	0.019	0.006	0.021	0.030
ST_DEBT	0.228	0.230	0.043	0.149	0.343
CASH_CYCLE	57.563	91.081	19.715	48.748	92.404
$\|DAC\|_{t-1}$	0.019	0.046	0.016	0.034	0.067
LIFO_RESERVE	0.013	0.025	0.000	0.000	0.015
DIV_PAYOUT	0.275	0.620	0.000	0.219	0.475
FLEXIBILITY	0.198	0.121	0.129	0.145	0.245
|OCF|	0.113	0.079	0.070	0.110	0.152

(*Continued on next page*)

TABLE 4 (Continued)

Panel B: Rank Correlations between Control and Endogenous Variables

		Endogenous Variable		
Control Variable	*Expected Sign*	*USER* *(n = 912)*	*DERIVATIVES* *(n = 654)*	*|DAC|* *(n = 654)*
Included in USER, DERIVATIVES, and |DAC| Equations (3)–(5)				
CASH_COMP	+	−0.324	0.107***	0.207***
STOCK	+	−0.319	−0.017	0.067**
OPTIONS	?	0.051	0.202***	0.029
CONVEXITY	+	0.080***	0.171***	0.083**
LEVERAGE	+	0.158***	0.122***	−0.047
DISTRESS	+	0.025	−0.097	0.055*
RD	+	0.346***	0.412***	0.078**
RD × LEVERAGE	+	0.383***	0.408***	0.066**
ANALYSTS	+	0.343***	0.119***	−0.070
DIVERSIFICATION	−	0.183	0.096	−0.142***
FRGN_SALES	+	0.351***	0.382***	0.038
Included only in USER and DERIVATIVES Equations (5) and (3)				
SIZE	+	0.386***	0.166***	0.028
DIV_YIELD	+	0.106***	−0.132	0.032
ST_DEBT	+	0.160***	0.265***	−0.054
CASH_CYCLE	+	0.156***	0.237***	0.001
Included only in |DAC| Equation (4)				
$\|DAC\|_{t-1}$	+	−0.034	−0.040	0.295***
LIFO_RESERVE	+	0.025	−0.035	−0.009
DIV_PAYOUT	−	−0.049	−0.034	−0.243***
FLEXIBILITY	+	−0.043	−0.002	0.228***
|OCF|	+	0.007	0.057*	0.085**

*, **, and *** denote significance at the 0.10, 0.05, and 0.01 levels, respectively, based on one-tailed tests for signed predictions, two-tailed tests otherwise.

Variables are defined as follows:

USER = indicator variable coded 1 if the firm uses financial derivative instruments, 0 otherwise;
DERIVATIVES = notional amount of interest rate and foreign currency derivatives, scaled by lagged total assets;

(*Continued on next page*)

TABLE 4 (Continued)

|DAC| = absolute value of discretionary accruals, i.e., regression residuals from equation (1);
CASH_COMP = salary and bonus compensation of CEO, scaled by lagged total assets;
STOCK = fair value of shares owned by CEO, scaled by lagged total assets;
OPTIONS = number of options outstanding held by CEO, scaled by lagged total assets;
CONVEXITY = excess of marginal tax rate (calculated as in Graham [1996]) over average tax rate (calculated as tax expense divided by pretax earnings);
LEVERAGE = total debt divided by total assets;
DISTRESS = probability of bankruptcy using Ohlson's (1980) model 1;
RD = research and development expense, scaled by total sales;
ANALYSTS = natural logarithm of the number of analysts following the firm;
DIVERSIFICATION = entropy index on business segment sales calculated following Palepu (1985);
FRGN_SALES = foreign sales divided by total sales;
SIZE = natural logarithm of the sum of total liabilities, preferred stock, and market capitalization of common stock;
DIV_YIELD = cash dividends divided by market capitalization of common stock;
ST_DEBT = short-term debt divided by total debt;
CASH_CYCLE = cash conversion cycle, calculated as the number of days inventory is in stock plus the number of days receivables (net of payables) are outstanding;
LIFO_RESERVE = beginning balance LIFO reserve, scaled by lagged total assets;
DIV_PAYOUT = cash dividends divided by premanaged earnings (i.e., earnings minus proxy for discretionary accruals from equation (1));
FLEXIBILITY = root mean squared error of regression (1) used to proxy |DAC|;
|OCF| = absolute value of operating cash flows, scaled by lagged total assets.

their cash compensation and using derivatives to increase the value of their stock and options.

CONVEXITY is positively associated only with |DAC|, consistent with tax function convexity creating an incentive to smooth earnings through accrual management. Although Panel B of Table 4 shows that CONVEXITY is positively associated with both USER and DERIVATIVES, I find no such association in a multivariate setting. These findings are not surprising given that previous research has found rather weak support for tax convexity as an incentive for the use of derivatives (e.g., Tufano 1996; Géczy et al. 1997; Allayannis and Ofek 2000; Graham and Rogers 2000).

LEVERAGE is positively associated with DERIVATIVES, whereas DISTRESS is positively associated with USER and |DAC|. These results provide mixed evidence consistent with managers using derivatives and discretionary accruals to lower debt financing costs by reducing creditors' perception of firm risk, freeing up potentially binding debt covenants, and increasing debt capacity.

RD is positively associated only with |DAC|, suggesting that R&D-intensive firms are more likely to have large discretionary accruals.[13] On the other hand, the RD × LEVERAGE interaction is positively associated only with USER and DERIVATIVES, consistent with the argument that firms with significant investment opportunities, coupled with costly external financing, are more likely to benefit from hedging.

ANALYSTS is positively associated with USER and DERIVATIVES, suggesting that firms with larger analyst following are more likely to use derivatives. Surprisingly, ANALYSTS is not significantly associated with |DAC|.

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[13] Indeed, untabulated results reveal a significant positive association between RD and signed discretionary accruals (rank correlation = 0.121, p = 0.002), consistent with managers using income-increasing accruals to prevent underinvestment in R&D.

TABLE 5
Regression Results for Self-Selection Simultaneous Equations

Equation:

$$\begin{aligned} USER_{it} = {} & \gamma_0 + \gamma_1 CASH\_COMP_{it} + \gamma_2 STOCK_{it} + \gamma_3 OPTIONS_{it} + \gamma_4 CONVEXITY_{it} + \gamma_5 LEVERAGE_{it} + \gamma_6 DISTRESS_{it} + \gamma_7 RD_{it} \\ & + \gamma_8 (RD \times LEVERAGE)_{it} + \gamma_9 ANALYSTS_{it} + \gamma_{10} DIVERSIFICATION_{it} + \gamma_{11} FRGN\_SALES_{it} + \gamma_{12} SIZE_{it} + \gamma_{13} DIV\_YIELD_{it} \\ & + \gamma_{14} ST\_DEBT_{it} + \gamma_{15} CASH\_CYCLE_{it} + \boldsymbol{\gamma_I}' \mathbf{INDUSTRY}_{it} + \boldsymbol{\gamma_Y}' \mathbf{YEAR}_{it} + \varepsilon_{it} \end{aligned} \tag{5}$$

$$\begin{aligned} DERIVATIVES_{it} = {} & \alpha_0 + \alpha_1 |DAC|_{it} + \alpha_2 CASH\_COMP_{it} + \alpha_3 STOCK_{it} + \alpha_4 OPTIONS_{it} + \alpha_5 CONVEXITY_{it} + \alpha_6 LEVERAGE_{it} + \alpha_7 \mathrm{DISTRESS}_{it} \\ & + \alpha_8 RD_{it} + \alpha_9 (RD \times LEVERAGE)_{it} + \alpha_{10} ANALYSTS_{it} + \alpha_{11} DIVERSIFICATION_{it} + \alpha_{12} FRG\_SALES_{it} + \alpha_{13} SIZE_{it} \\ & + \alpha_{14} DIV\_YIELD_{it} + \alpha_{15} ST\_DEBT_{it} + \alpha_{16} CASH\_CYCLE_{it} + \alpha_{17} MILLS_{it} + \boldsymbol{\alpha_I}' \mathbf{INDUSTRY}_{it} + \boldsymbol{\alpha_Y}' \mathbf{YEAR}_{it} + \zeta_{it} \end{aligned} \tag{3}$$

$$\begin{aligned} |DAC|_{it} = {} & \beta_0 + \beta_1 DERIVATIVES_{it} + \beta_2 CASH\_COMP_{it} + \beta_3 STOCK_{it} + \beta_4 OPTIONS_{it} + \beta_5 CONVEXITY_{it} + \beta_6 LEVERAGE_{it} \\ & + \beta_7 DISTRESS_{it} + \beta_8 RD_{it} + \beta_9 (RD \times LEVERAGE)_{it} + \beta_{10} ANALYSTS_{it} + \beta_{11} DIVERSIFICATION_{it} + \beta_{12} FRGN\_SALES_{it} \\ & + \beta_{13} |DAC|_{it-1} + \beta_{14} LIFO\_RESERVE_{it} + \beta_{15} DIV\_PAYOUT_{it} + \beta_{16} FLEXIBILITY_{it} + \beta_{17} |OCF|_{it} + \beta_{18} MILLS_{it} \\ & + \boldsymbol{\beta_I}' \mathbf{INDUSTRY}_{it} + \boldsymbol{\beta_Y}' \mathbf{YEAR}_{it} + \xi_{it} \end{aligned} \tag{4}$$

		Equation					
		USER[a]		*DERIVATIVES*[b]		*|DAC|*[b]	
Variable	*Expected Sign*	*Marginal Probability*	*z-stat.*	*Standardized Coefficient*	*t-stat.*	*Standardized Coefficient*	*t-stat.*
|DAC|	–			–0.347	–9.634***		
DERIVATIVES	–					–0.345	–8.487***
CASH_COMP	+	–0.121	–2.470	–0.027	–0.445	0.247	4.422***
STOCK	+	0.003	0.310	0.104	2.302**	0.047	0.756
OPTIONS	?	–0.008	–0.330	0.113	2.812***	0.017	0.573
CONVEXITY	+	0.383	–1.820	0.044	0.837	0.098	2.247**
LEVERAGE	+	–0.068	–0.870	0.076	2.056**	0.089	1.208
DISTRESS	+	0.308	2.370***	–0.046	–0.867	0.098	1.460*

(*Continued on next page*)

TABLE 5 (Continued)

		Equation					
		USER^a		*DERIVATIVES*^{b}		*|DAC|*^{b}	
Variable	*Expected Sign*	*Marginal Probability*	*z-stat.*	*Standardized Coefficient*	*t-stat.*	*Standardized Coefficient*	*t-stat.*
RD	+	0.327	0.210	−0.085	−1.252	0.148	1.568*
RD × LEVERAGE	+	15.141	3.680***	0.097	1.446*	0.048	0.599
ANALYSTS	+	0.043	2.180**	0.080	1.823**	0.061	1.077
DIVERSIFICATION	−	0.028	1.010	0.029	0.931	−0.067	−1.787**
FRGN_SALES	+	0.436	5.240***	0.142	3.982***	0.027	0.521
SIZE	+	0.080	3.500***	−0.072	−0.687		
DIV_YIELD	+	−0.139	−0.200	0.051	2.111**		
ST_DEBT	+	−0.031	−0.550	0.068	1.334*		
CASH_CYCLE	+	0.001	0.460	0.057	2.222**		
|DAC|$_{t-1}$	+					0.265	5.378***
LIFO_RESERVE	+					0.036	0.922
DIV_PAYOUT	−					−0.122	−3.860***
FLEXIBILITY	+					0.206	3.683***
|OCF|	+					0.153	2.117**
MILLS	?			−0.103	−1.641	−0.069	−0.733
Number of firm-years		912		654		654	
Pseudo/adjusted R^2		32.5%		20.8%		27.0%	
Percentage correctly classified		80.7%					
Hausman t-statistic				−1.917*		−2.876***	

(*Continued on next page*)

TABLE 5 (Continued)

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*, **, and *** denote significance at the 0.10, 0.05, and 0.01 levels, respectively, based on one-tailed tests for signed predictions, two-tailed tests otherwise. Tests are based on groupwise heteroscedasticity-consistent standard errors.

[a] Equation is estimated on entire sample using probit regression. Marginal probabilities are calculated by multiplying each estimated coefficient by $\phi(\mathbf{xg})$, where ϕ is the normal density, $\mathbf{x}$ is a vector containing the means of the right-hand-side variables, and $\mathbf{g}$ is a vector containing the estimated coefficients.

[b] Equation is estimated on sample of *derivative users* using 2SLS regression. Standardized coefficients are calculated by multiplying the estimated coefficient by the ratio of the standard deviation of the associated right-hand-side variable to the standard deviation of the left-hand-side variable.

MILLS is the inverse Mills ratio obtained from equation (5). **INDUSTRY** is a vector of indicator variables for each industry group identified in Panel A of Table 1, except for the consumer goods and energy groups. **YEAR** is a vector of indicator variables for 1995 and 1996. All other variables are defined in Table 4.

DIVERSIFICATION is negatively associated with |DAC| only, consistent with more diversified firms having smaller discretionary accruals. On the other hand, FRGN_SALES is positively associated with both USER and DERIVATIVES, consistent with managers using derivatives to hedge foreign exchange rate risk stemming from international diversification.

Finally, with the exception of SIZE and LIFO_RESERVE, the coefficients of the identifying variables are all significant. These results, together with the rank correlations reported in Panel B of Table 4, suggest that these variables successfully identify the simultaneous equations.

VI. SENSITIVITY TESTS

Sensitivity tests show that the significant negative association between DERIVATIVES and |DAC| reported in Table 5 cannot be attributed to model misspecification, measurement error in DERIVATIVES and |DAC|, or alternative definitions of the control variables.

Model Misspecification

The results discussed in Section V are consistent with the assumption that managers select risk and earnings management policies jointly. An alternative assumption is that managers select these policies sequentially. That is, managers may decide on a hedging policy at the beginning of the year and then use discretionary accruals to reduce any residual volatility at the end of the year. These two assumptions are not necessarily mutually exclusive.

To assess whether the results are sensitive to the joint vs. sequential assumption, I reestimate the |DAC| equation (4) after replacing the right-hand-side variables DERIVATIVES and MILLS with their lagged values (which loses one year of data). Results reported in Table 6 show that the coefficient of lagged DERIVATIVES is negative, consistent with a sequential decision first to use derivatives and then to manage discretionary accruals. However, this coefficient (−0.070) is much smaller in absolute terms than the one reported in Table 5 for the current level of DERIVATIVES (−0.345), suggesting that the current level of derivatives has a stronger effect on discretionary accruals than do lagged levels. While I cannot rule out that derivatives and discretionary accruals are, to some extent, determined sequentially, the results are consistent with managers primarily selecting risk and earnings management policies jointly.

Measurement Error in DERIVATIVES and |DAC|

An alternative interpretation of the Hausman (1978) tests reported in Table 5 is that the correlation between the regression residuals from estimating the simultaneous equations and the variables DERIVATIVES and |DAC| is due to measurement error rather than to endogeneity. Although data limitations preclude me from measuring derivative use as the firm's actual hedge ratio, the results reported in Panel B of Table 2 (discussed in Section II) suggest that DERIVATIVES successfully captures basic attributes of hedging. In contrast, the measurement error in |DAC| is potentially more severe. The modified Jones (1991) model is the most powerful accruals expectation model available in the current literature (Dechow et al. 1995; Guay et al. 1996). However, it misclassifies as discretionary accruals otherwise normal (and presumably nondiscretionary) accruals related, for example, to changes in the firm's business fundamentals, life-cycle stage, and nonoperating activities (Bernard and Skinner 1996; Healy 1996).

The 2SLS procedure that I use to estimate the simultaneous equations yields consistent and unbiased estimates even in the presence of measurement error, and it is also robust to

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TABLE 6
Regression Results for |DAC| Equation Assuming Derivative Use and Accrual Management are Sequential Decisions

Equation:[a]

$$\begin{aligned}|DAC|_{it} = {} & \omega_0 + \omega_1 DERIVATIVES_{it-1} + \omega_2 CASH\_COMP_{it} + \omega_3 STOCK_{it} + \omega_4 OPTIONS_{it} \\ & + \omega_5 CONVEXITY_{it} + \omega_6 LEVERAGE_{it} + \omega_7 DISTRESS_{it} + \omega_8 RD_{it} \\ & + \omega_9 (RD \times LEVERAGE)_{it} + \omega_{10} ANALYSTS_{it} + \omega_{11}\, DIVERSIFICATION_{it} \\ & + \omega_{12} FRGN\_SALES_{it} + \omega_{13}|DAC|_{it-1} + \omega_{14} LIFO\_RESERVE_{it} + \omega_{15} DIV\_PAYOUT_{it} \\ & + \omega_{16} FLEXIBILITY_{it} + \omega_{17}|OCF|_{it} + \omega_{18} MILLS_{it-1} + \omega_{19} YEAR95_{it} + \omega_I' INDUSTRY_{it} \\ & + \eta_{it}\end{aligned}$$

Independent Variable	*Expected Sign*	*Standardized Coefficient*	*t-statistic*
$DERIVATIVES_{t-1}$	−	−0.070	−1.345*
CASH_COMP	+	0.136	2.236**
STOCK	+	−0.049	−0.659
OPTIONS	?	0.007	0.176
CONVEXITY	+	0.069	1.302*
LEVERAGE	+	0.036	0.483
DISTRESS	+	0.122	1.661**
RD	+	−0.079	−0.757
RD × LEVERAGE	+	0.070	0.784
ANALYSTS	+	0.043	0.708
DIVERSIFICATION	−	−0.076	−1.927**
FRGN_SALES	+	−0.025	−0.463
$\lvert DAC\rvert_{t-1}$	+	0.294	5.272***
LIFO_RESERVE	+	0.042	0.906
DIV_PAYOUT	−	−0.075	−2.026**
FLEXIBILITY	+	0.044	0.663
|OCF|	+	0.289	4.043***
$MILLS_{t-1}$	?	0.039	0.525
Number of firm-years		436	
Adjusted R^2		27.5%	

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*, **, and *** denote significance at the 0.10, 0.05, and 0.01 levels, respectively, based on one-tailed tests for signed predictions, two-tailed tests otherwise. Tests are based on groupwise heteroscedasticity-consistent standard errors.

[a] Regression is estimated on 1995–1996 data for the sample of *derivative users* using ordinary least squares. Standardized coefficients are calculated by multiplying the estimated coefficient by the ratio of the standard deviation of the associated independent variable to the standard deviation of the dependent variable.

MILLS is the inverse Mills ratio obtained from equation (5). YEAR95 is an indicator variable coded 1 for year 1995, 0 otherwise. All other variables are defined in Table 4.

the presence of other estimation problems such as collinearity and specification error (see Kennedy 1998). Nonetheless, I perform the following sensitivity tests.

First, I reestimate the simultaneous equations using three-stage least squares, which accounts for any residual correlation across the equations. Such correlation could arise if omitted variables cause measurement error in both DERIVATIVES and |DAC|. The results (not shown) yield essentially similar inferences.

Second, I compare the volatilities of proxies for discretionary and nondiscretionary accruals. Xie (2000) argues and finds evidence that discretionary accruals estimated using the modified Jones (1991) model are more volatile and less persistent than estimates of nondiscretionary accruals. I proxy for nondiscretionary accruals using the fitted value of equation (1). Consistent with Xie's (2000) findings, the coefficient of variation of discretionary accruals for my sample firms is significantly larger than that of nondiscretionary accruals (median of 1.647 vs. 0.761; signed rank test $z = 11.236$, $p = 0.000$).

Third, I correlate DERIVATIVES with the absolute value of the proxy for nondiscretionary accruals. McNichols and Wilson (1988) argue that one can infer measurement bias in earnings management studies from a significant correlation between the variable explaining earnings management (i.e., DERIVATIVES) and the proxy for nondiscretionary accruals. For derivative users in my sample, the rank correlation between these variables is an insignificant −0.018, suggesting that bias is not driving my main results.

Finally, I estimate the M score, an alternative earnings management proxy based on Beneish's (1999) earnings management prediction model. As expected, untabulated results show that M is negatively correlated with DERIVATIVES and positively correlated with |DAC|. I interpret these results with caution, however, because Beneish's (1999) sample differs markedly from mine. For example, firms in my sample have sales and assets over 100 times larger than do firms he reports as having violated GAAP.

Alternative Definitions of Control Variables

The results supporting my hypothesis are largely invariant to alternative measures of the control variables. Other proxies that were considered include: for OPTIONS, the fair value of exercisable in-the-money stock options held by the CEO, scaled by lagged total assets; for CONVEXITY, an indicator coded 1 if the marginal tax rate exceeds the average tax rate, 0 otherwise, and an indicator coded 1 if the firm has NOL carryforwards or an average tax rate lower than 35 percent, 0 otherwise; for LEVERAGE, the ratio of total debt to market value of assets, the latter calculated as the sum of total liabilities, preferred stock, and market capitalization of common stock; for RD, R&D expense scaled by total assets, and other proxies for growth options including the ratio of market to book value of equity, capital expenditures scaled by total assets, and the sum of capital expenditures, advertising expense and R&D expense scaled by either sales or total assets; for ANALYSTS, the number of analysts following the firm, unscaled and scaled by SIZE; for DIVERSIFICATION, related and unrelated diversification entropy indexes; and for FRGN_SALES, an indicator coded 1 if the firm has foreign pretax earnings, 0 otherwise.

VII. SUMMARY

I present evidence consistent with the hypothesis that managers view derivatives and discretionary accruals as partial substitutes for smoothing earnings. Using 1994–1996 data for a sample of nonfinancial, nonregulated *Fortune 500* firms, I estimate a set of simultaneous equations that captures managers' incentives to maintain a desired level of earnings volatility through hedging and managing accruals. These incentives include increasing managerial compensation and wealth, reducing corporate income taxes and debt financing costs, avoiding underinvestment and earnings surprises, and mitigating volatility caused by low diversification. I measure derivatives using notional amounts and discretionary accruals using the modified Jones (1991) model. The empirical results show that managers appear to trade off derivatives and discretionary accruals at the margin. That is, after controlling for incentives to smooth earnings, firms holding derivative portfolios with large notional amounts have lower absolute levels of discretionary accruals. Finally, the results also suggest that the magnitudes of notional amounts and discretionary accruals are endogenous and, therefore, most likely the result of a joint decision to manage risks and earnings.

Although sensitivity tests indicate that the results supporting my hypothesis are robust, these results should still be interpreted within the limitations of the study's research design. I must emphasize two particular limitations. First, hedging and earnings management are difficult to measure precisely using publicly available data and, therefore, measurement error is unavoidable. Second, the literature provides little guidance for specifying and identifying a model that explains the tradeoff between hedging and earnings management.

Despite these limitations, my study provides evidence suggesting that managers smooth their firms' earnings by adjusting the volatilities of cash flows and accruals. It also offers some insight into the possible effects that newly issued SFAS No. 133 may have on firms' hedging and earnings management strategies. A major criticism of SFAS No. 133 is its potential to increase earnings volatility (e.g., Osterland 2000). Because earnings volatility is costly to both managers and their firms, SFAS No. 133 may increase the costs of using derivatives vis-à-vis discretionary accruals. If, as my results suggest, managers view derivatives and discretionary accruals as substitute tools for smoothing earnings, then the imposition of SFAS No. 133 could reduce hedging and increase earnings management. SFAS No. 133 becomes effective for fiscal years beginning after June 15, 2000, so I leave this question for future research.

REFERENCES

Ahmed, A. S., A. Beatty, and B. Bettinghaus. 1998. Interest rate risk management of bank holding companies: An examination of tradeoffs in the use of investment securities and interest rate swaps. Working paper, Pennsylvania State University, University Park, PA.

Allayannis, G., and E. Ofek. 2000. Exchange rate exposure, hedging, and the use of foreign currency derivatives. Working paper, New York University, New York, NY.

Baber, W. R., P. M. Fairfield, and J. A. Haggard. 1991. The effect of concern about reported income on discretionary spending decisions: The case of research and development. *The Accounting Review* 66 (October): 818–829.

———, S-H. Kang, and K. R. Kumar. 1998. Accounting earnings and executive compensation: The role of earnings persistence. *Journal of Accounting and Economics* 25 (May): 169–193.

Balsam, S. 1998. Discretionary accounting choices and CEO compensation. *Contemporary Accounting Research* 15 (Fall): 229–252.

Barth, M. E., J. A. Elliott, and M. W. Finn. 1999. Market rewards associated with patterns of increasing earnings. *Journal of Accounting Research* 37 (Autumn): 387–413.

Beatty, A., S. L. Chamberlain, and J. Magliolo. 1995. Managing financial reports of commercial banks: The influence of taxes, regulatory capital, and earnings. *Journal of Accounting Research* 33 (Autumn): 231–261.

Beneish, M. D. 1999. The detection of earnings manipulation. *Financial Analysts Journal* 55 (September-October): 24–36.

Bernard, V. L., and D. J. Skinner. 1996. What motivates managers' choice of discretionary accruals? *Journal of Accounting and Economics* 22 (August-December): 313–325.

Collins, D. W., and P. Hribar. 1999. Errors in estimating accruals: Implications for empirical research. Working paper, University of Iowa, Iowa City, IA.

Cragg, J. G. 1971. Some statistical models for limited dependent variables with applications to the demand for durable goods. *Econometrica* 39 (September): 829–844.

Dechow, P. M., R. G. Sloan, and A. P. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (April): 193–225.

DeFond, M. L., and C. W. Park. 1997. Smoothing income in anticipation of future earnings. *Journal of Accounting and Economics* 23 (July): 115–139.

Financial Accounting Standards Board (FASB). 1994. *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments*. Statement of Financial Accounting Standards No. 119. Stamford, CT: FASB.

———. 1998. *Accounting for Derivative Instruments and Hedging Activities*. Statement of Financial Accounting Standards No. 133. Norwalk, CT: FASB.

Fox, J. 1997. Learn to play the earnings game (and Wall Street will love you). *Fortune* (March 31): 76–80.

Froot, K. A., D. S. Scharfstein, and J. C. Stein. 1993. Risk management: Coordinating corporate investment and financing policies. *The Journal of Finance* 48 (December): 1629–1658.

Gaver, J. J., K. M. Gaver, and J. R. Austin. 1995. Additional evidence on bonus plans and income management. *Journal of Accounting and Economics* 19 (February): 3–28.

———, and J. S. Paterson. 1999. Managing insurance company financial statements to meet regulatory and tax reporting goals. *Contemporary Accounting Research* 16 (Summer): 207–241.

Géczy, C., B. A. Minton, and C. Schrand. 1997. Why firms use currency derivatives. *The Journal of Finance* 52 (September): 1323–1354.

Graham, J. R. 1996. Proxies for the corporate marginal tax rate. *Journal of Financial Economics* 42 (October): 187–221.

———, and C. W. Smith, Jr. 1999. Tax incentives to hedge. *The Journal of Finance* 54 (December): 2241–2262.

———, and D. A. Rogers. 2000. Do firms hedge in response to tax incentives? Working paper, Duke University, Durham, NC.

Guay, W. R. 1999. The impact of derivatives on firm risk: An empirical examination of new derivative users. *Journal of Accounting and Economics* 26 (January): 319–351.

———, S. P. Kothari, and R. L. Watts. 1996. A market-based evaluation of discretionary accrual models. *Journal of Accounting Research* 34 (Supplement): 83–105.

Haushalter, G. D. 2000. Financing policy, basis risk, and corporate hedging: Evidence from oil and gas producers. *The Journal of Finance* 55 (February): 107–152.

Hausman, J. A. 1978. Specification tests in econometrics. *Econometrica* 46 (November): 1251–1271.

Healy, P. 1996. Discussion of a market-based evaluation of discretionary accrual models. *Journal of Accounting Research* 34 (Supplement): 107–115.

Hunt, A., S. E. Moyer, and T. Shevlin. 1996. Managing interacting accounting measures to meet multiple objectives: A study of LIFO firms. *Journal of Accounting and Economics* 21 (June): 339–374.

Johnson, N. S. 1999. Current SEC developments—"Managed earnings" and "The year of the accountant." Remarks delivered at the Utah State Bar Mid-Year Convention, St. George, UT. March 6. Securities and Exchange Commission. Available at http://www.sec.gov/news/speeches/spch264.txt.

Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (Autumn): 193–228.

Kennedy, P. 1998. *A Guide to Econometrics*. 4th edition. Cambridge, MA: The MIT Press.

Leland, H. E. 1998. Agency costs, risk management, and capital structure. *The Journal of Finance* 53 (August): 1212–1243.

Li, G. 1985. Robust regression. In *Exploring Data Tables, Trends, and Shapes*, edited by D. C. Hoaglin, F. Mosteller, and J. W. Tukey. New York, NY: Wiley.

Loomis, C. J. 1999. Lies, damned lies, and managed earnings: The crackdown is here. *Fortune* (August 2): 75–92.

McNichols, M., and G. P. Wilson. 1988. Evidence of earnings management from the provision for bad debts. *Journal of Accounting Research* 26 (Supplement): 1–31.

Minton, B. A., and C. Schrand. 1999. The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing. *Journal of Financial Economics* 54 (December): 423–460.

Myers, L. A., and D. J. Skinner. 1999. Earnings momentum and earnings management. Working paper, University of Michigan, Ann Arbor, MI.

Ohlson, J. A. 1980. Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research* 18 (Spring): 109–131.

Osterland, A. 2000. Derivatives: Good morning, volatility. *CFO* (July): 129–133.

Palepu, K. 1985. Diversification strategy, profit performance and the entropy measure. *Strategic Management Journal* 6 (July-September): 239–255.

Petersen, M. A., and S. R. Thiagarajan. 2000. Risk measurement and hedging: With and without derivatives. Working paper, Northwestern University, Evanston, IL.

Rajgopal, S., and M. Pincus. 2000. The interaction of accounting policy choice and hedging: Evidence from oil and gas firms. Working paper, University of Washington, Seattle, WA.

Schrand, C., and H. Unal. 1998. Hedging and coordinated risk management: Evidence from thrift conversions. *The Journal of Finance* 53 (June): 979–1013.

Skinner, D. J., and R. G. Sloan. 1999. Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. Working paper, University of Michigan, Ann Arbor, MI.

Smith, C. W., and R. M. Stulz. 1985. The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis* 20 (December): 391–405.

Subramanyam, K. R. 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22 (August-December): 249–281.

Tufano, P. 1996. Who manages risk? An empirical examination of risk management practices in the gold mining industry. *The Journal of Finance* 51 (September): 1097–1137.

Visvanathan, G. 1998. Who uses interest rate swaps? A cross-sectional analysis. *Journal of Accounting, Auditing, and Finance* 13 (Summer): 173–200.

Watts, R. L., and J. L. Zimmerman. 1986. *Positive Accounting Theory*. Englewood Cliffs, NJ: Prentice Hall.

Xie, H. 2000. Are discretionary accruals mispriced? A reexamination. Working paper, The University of Arizona, Tucson, AZ.

THE ACCOUNTING REVIEW
Vol. 76, No. 1
January 2001
pp. 27–58

Accruals and the Prediction of Future Cash Flows

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ABSTRACT: Building on the Dechow et al. (1998) model of the accrual process, this study investigates the role of accruals in predicting future cash flows. The model shows that each accrual component reflects different information relating to future cash flows; aggregate earnings masks this information. As predicted, disaggregating accruals into major components—change in accounts receivable, change in accounts payable, change in inventory, depreciation, amortization, and other accruals—significantly enhances predictive ability. Each accrual component, including depreciation and amortization, is significant with the predicted sign in predicting future cash flows, incremental to current cash flow. The cash flow and accrual components of current earnings have substantially more predictive ability for future cash flows than several lags of aggregate earnings. The inferences are robust to alternative specifications, including controlling for operating cash cycle and industry membership.

Key Words: *Accruals, Cash flow, Earnings, Cash flow prediction.*

Data Availability: *The data used in this study are from the public sources identified in the text.*

The authors appreciate comments by Sudipta Basu, Bill Beaver, Gerald Feltham, S. P. Kothari, Stephen Ryan, two anonymous reviewers, Ken Gaver (the Associate Editor), and workshop participants at the American Accounting Association 1999 Annual Meeting, the Ninth Annual Conference on Financial Economics and Accounting, Stanford University Accounting Summer Camp, University of British Columbia, California State University, Fullerton, Baruch College–CUNY, The George Washington University, Massachusetts Institute of Technology, and Rutgers University. The support of the Massachusetts Institute of Technology Sloan School of Management, and the Stanford University Graduate School of Business Faculty Trust and Financial Research Initiative is gratefully acknowledged.

Submitted November 1999
Accepted August 2000

I. INTRODUCTION

This study investigates the role of accruals in predicting future cash flows. A firm's ability to generate cash flow affects the values of its securities. For this reason, the Financial Accounting Standards Board (FASB) indicates that a primary objective of financial reporting is to provide information to help investors, creditors, and others assess the amount and timing of prospective cash flows (FASB 1978, ¶37–39). Moreover, the FASB asserts that information about earnings *and its components* is generally more predictive of future cash flows than current cash flow (FASB 1978, ¶44). Several prior studies test the relative abilities of aggregate earnings and cash flow to predict future cash flows, but do not examine how the components of earnings affect its ability to predict future cash flows. We build on the model of Dechow et al. (1998) (hereafter DKW) to develop predictions about the role of accruals in predicting future cash flows. As predicted, we find that disaggregating earnings into cash flow and the major components of accruals significantly enhances earnings' predictive ability. Thus, this study extends our understanding of the temporal relations among accruals, cash flows, and earnings, and provides evidence consistent with the FASB's assertion that knowledge of the components of earnings is important for predicting future cash flows.

Our extended analysis of the DKW model, which focuses on predicting cash flow next period, reveals that the various accrual components of earnings capture different information not only about delayed cash flows related to past transactions, but also about expected future cash flows related to management's expected future operating and investing activity. Aggregate earnings, and thus aggregate accruals, masks this information by weighting the components equally. Thus, we predict that disaggregating earnings into cash flow and the components of accruals enhances earnings' predictive ability relative to aggregate earnings. A key insight from our extended analysis of the model is that current cash flow and the major components of current period accruals reflect the same information about cash flow next period as do multiple lags of aggregate earnings.

The empirical tests focus on annual amounts and disaggregate accruals into six major components: change in accounts receivable, change in inventory, change in accounts payable, depreciation, amortization, and other accruals.[1] Based on the weights on the accrual components implied by the model, we predict that each accrual component has a different relation with future cash flows, and that increases in accounts receivable and inventory and decreases in accounts payable are associated with higher future cash flows. We also predict that depreciation of fixed assets and amortization of intangible assets are associated with higher future cash flows. We find that the relation between cash flow next year and current cash flow and each component of accruals is significant and has a sign consistent with predictions. Moreover, the relations differ significantly from each other, in absolute value. Thus, as predicted, we find that aggregate earnings masks information relevant for predicting future cash flows. We also find that long-term accruals, i.e., depreciation and amortization, have significant predictive ability for future cash flows. This evidence is inconsistent with suggestions in the financial press that depreciation and amortization do not predict future firm performance (e.g., MacDonald 1999a, 1999b), calling into question analysts' recent focus on "cash earnings," which excludes these accruals.

The model leads to the prediction that disaggregated current earnings has the same predictive ability for next period cash flow as do current and two lags of aggregate earnings.

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[1] The term "accruals" refers to adjustments from operating cash flow to earnings, e.g., change in accounts receivable, rather than adjustments from cash to net worth, e.g., accounts receivable, which we refer to as balance sheet accruals.

However, our empirical analysis reveals that disaggregated current earnings has significantly more predictive ability than current and up to six years of lagged aggregate earnings. This evidence suggests that the model's simplifying assumptions about the accrual process understate the predictive ability of the accrual components relative to aggregate earnings.

We investigate whether disaggregated earnings' significantly greater predictive ability is attributable to disaggregating cash flow and aggregate accruals or to disaggregating accruals. The findings reveal that disaggregating earnings into cash flow and aggregate accruals significantly increases predictive ability relative to aggregate earnings, but that disaggregating accruals into its major components further significantly increases predictive ability. Our inferences regarding the superior predictive ability of disaggregated earnings are robust to a variety of sensitivity checks, including predicting cash flows several years in the future, controlling for firms' operating cash cycles and industry membership, and using share prices, returns, and discounted future cash flows as proxies for expected future cash flows.

The remainder of the paper is organized as follows. Section II relates this study to extant research. Section III develops the model and empirical predictions. Section IV specifies the estimation equations. Section V describes the sample and presents the primary findings. Section VI presents results from additional analyses. Section VII summarizes and concludes.

II. RELATION TO PRIOR RESEARCH

The role of accruals in predicting future cash flows is a fundamental question underlying financial reporting. Prior research directly addressing this question typically uses small samples limited by long time-series requirements; the results of this research are mixed. Bowen et al. (1986) does not find that aggregate earnings provides better predictions of future cash flows than past cash flow. In contrast, Greenberg et al. (1986) concludes that aggregate earnings has more predictive ability than cash flow, and Lorek and Willinger (1996), focusing on quarterly rather than annual amounts, finds that accruals have predictive ability incremental to cash flow. Finger (1994) finds that cash flow is marginally superior to aggregate earnings for short prediction horizons, but earnings and cash flow perform equally well for longer horizons. Using a larger sample, Burgstahler et al. (1998) finds that cash flow has more predictive ability than aggregate earnings.[2]

Our analysis of the model reveals that neither current aggregate earnings nor current cash flow is an unbiased predictor of future cash flows, and that the bias in each is a function of accruals. Thus, one possible explanation for the mixed results of prior research is that the relative magnitudes of the biases depend on sample composition, which is manifest in the small sample studies. Similar to Burgstahler et al. (1998), for our large sample of firms we find that current cash flow has more predictive ability for future cash flows than current aggregate earnings. However, we leave to future research clear resolution of the mixed findings of prior research. Our contribution to this research is showing that limiting the inquiry to aggregate earnings masks the ability of accrual components to predict future cash flows incremental to current cash flow.

DKW models cash flow and the accrual process related to accounts receivable, accounts payable, and inventory to derive the prediction that current earnings is the best predictor of future cash flows. DKW reports that firm-specific variation in cash flow forecast errors based on aggregate earnings is significantly lower than that based on cash flow. DKW also reports that in firm-specific regressions of future cash flows on aggregate current earnings and cash flow, both have incremental explanatory power. DKW does not explore the model's implications for the predictive ability of earnings components, including the components of accruals.

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[2] Several of these studies also predict cash flow more than one period ahead; we do so in Section VI.

We extend the analysis of the DKW model to show that earnings' superiority for predicting future cash flows stems from disaggregating earnings into cash flow and the components of accruals. The differences across accrual components are not evident from DKW's empirical analysis because DKW implicitly permits the aggregate earnings coefficient to differ firm by firm. Our analysis of the model and empirical results also extend DKW by showing that several past aggregate earnings have explanatory power for predicting future cash flows, incremental to aggregate current earnings, and that disaggregated current earnings has significantly more predictive ability than several lags of aggregate earnings.

DKW's analysis also indicates that the predictive ability of aggregate earnings relative to cash flow varies with firms' operating cash cycles. We show that even after partitioning on operating cash cycle, following DKW, aggregate earnings masks significant information relevant to predicting future cash flows. Finally, we show that long-term accruals aid in predicting future cash flows; DKW focuses on working capital accruals.

This study also relates to research comparing the predictive abilities of earnings and cash flow using share prices as an implicit or explicit proxy for expected future cash flows. For example, Ball and Brown (1968), Beaver and Dukes (1972), and Dechow (1994) find that returns are more highly associated with aggregate earnings than with cash flow. Several other studies (e.g., Rayburn 1986; Wilson 1986, 1987; Bowen et al. 1987; Ali 1994; Cheng et al. 1996; Pfeiffer et al. 1998) document that aggregate earnings and cash flow are incrementally informative for returns. Some prior research also finds that components of earnings, including accruals and accrual components, have different pricing multiples, as predicted by differences in the components' persistence (e.g., Lipe 1986; Barth et al. 1990; Barth et al. 1992; Barth et al. 1999, 2000). We contribute to this research by showing that cash flow and the major accrual components of earnings have different multiples when predicting future cash flows, as predicted by a model of the accrual process.

We focus on the implications of cash flow and the accrual components of earnings for firms' expected future cash flows rather than for firms' share prices for two primary reasons. First, cash flow prediction is fundamental to assessing firm value as reflected in share prices. Thus, cash flow is a primitive valuation construct. Our use of realized future cash flows as a proxy for expected future cash flows assumes rational expectations, as does prior accounting research in a variety of contexts (e.g., McNichols and Wilson 1988; Penman and Sougiannis 1998; Aboody et al. 1999). Second, prior research provides evidence that share prices fail to reflect accurately the differential persistence of accruals and cash flow (e.g., Sloan 1996; Barth and Hutton 2000; DeFond and Park 2000; Xie 2000). This evidence calls into question the use of share prices as a proxy for expected future cash flows when examining the predictive ability of accruals and cash flow. Nonetheless, to facilitate comparison with prior research, we estimate price- and returns-based specifications with no change in inferences regarding the predictive ability of disaggregated earnings.

III. MODEL

DKW models operating cash flows and the accrual process to generate predictions for the relative abilities of earnings and cash flow to predict future cash flows. Because our objective is similar to DKW, we expand the analysis of the DKW model to obtain our predictions.

Model Assumptions

The model assumes earnings, EARN, equals a constant proportion of sales, S, and sales follows a random walk:

$$\mathrm{EARN}_t = \pi S_t \quad \text{and} \quad S_t = S_{t-1} + \varepsilon_t, \tag{1}$$

where $0 < \pi < 1$ is the profit rate, t denotes time period, and ε_t is a mean zero random shock.[3] The model also includes three balance sheet accruals: accounts receivable, AR; accounts payable, AP; and inventory, INV. AR is modeled as a constant proportion, α, of sales and AP is modeled as a constant proportion, β, of purchases or production, P_t:[4]

$$\begin{aligned} \mathrm{AR}_t &= \alpha S_t \quad \text{and} \quad \mathrm{AP}_t = \beta P_t \\ \Delta \mathrm{AR}_t &= \alpha \varepsilon_t \quad \text{and} \quad \Delta \mathrm{AP}_t = \beta \Delta P_t, \end{aligned} \tag{2}$$

where Δ denotes a one-period change, e.g., $\Delta \mathrm{AR}_t = \mathrm{AR}_t - \mathrm{AR}_{t-1}$. Assuming $0 < \alpha < 1$ allows a portion of sales to be received in cash in the next period. Similarly, assuming $0 < \beta < 1$ allows a portion of purchases to be paid in cash in the next period.

Following Bernard and Stober (1989), DKW models an inventory policy with a target inventory level proportional to cost of sales, which is not fully achieved in the period of the sales shock. The firm adjusts inventory to the target level over two periods. Two model parameters, γ_1 and γ_2, reflect the inventory policy, where $0 < \gamma_1, \gamma_2 < 1$. γ_1 is the fraction of cost of goods sold, $(1 - \pi)$ S_t, that is the target inventory level and γ_2 is the fraction of the current sales shock, ε_t, not included in inventory in the current period because it is deferred to the next period.[5] Thus, current period purchases equals current period cost of sales, plus the initial inventory adjustment for the current sales shock, plus the lagged adjustment for the prior sales shock:

$$\begin{aligned} P_t &= (1 - \pi)S_t + \gamma_1(1 - \pi)\varepsilon_t - \gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_t \\ &= (1 - \pi)S_t + \gamma_1(1 - \pi)[(1 - \gamma_2)\varepsilon_t + \gamma_2\varepsilon_{t-1}]. \end{aligned} \tag{3}$$

Equation (3) indicates that if $\gamma_1 = 0$, i.e., there is no inventory, then purchases equals cost of goods sold. If $\gamma_2 = 0$, i.e., management contemporaneously fully adjusts inventory in response to a sales shock, then purchases equals cost of goods sold plus the total inventory effect of the sales shock, $\gamma_1(1 - \pi)\varepsilon_t$. Because purchases equals cost of goods sold plus the change in inventory, equation (3) can be used to obtain expressions for the current period change in inventory, $\Delta \mathrm{INV}_t$, and the expected inventory change next period, $E_t[\Delta \mathrm{INV}_{t+1}]$:

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[3] We restrict π to be positive because, even though a firm can have negative earnings in a particular year, π is an intertemporally constant firm-specific parameter. Thus, negative π would assume a firm always has negative earnings, which is not reasonable.

[4] Henceforth, references to purchases should be interpreted as purchases or production.

[5] Although the inventory assumptions might not mirror precisely the policies of real firms, they capture the notion that not all accruals reverse in a single period and that, as explained below, accruals reflect more information than simply the one-period delayed payments or receipts associated with past purchases or sales. In particular, accruals can reflect information related to management's expected future activity (see also Bernard and Noel 1991).

$$\begin{aligned}\Delta INV_t &= \gamma_1(1-\pi)[(1-\gamma_2)\varepsilon_t+\gamma_2\varepsilon_{t-1}]\\ E_t[\Delta INV_{t+1}] &= \gamma_1\gamma_2(1-\pi)\varepsilon_t,\end{aligned} \tag{4}$$

where $E_t[\cdot]$ is the expectations operator conditioned on time t information. With a delayed inventory adjustment, i.e., $\gamma_1, \gamma_2 > 0$, $E_t[\Delta INV_{t+1}]$ equals 0 only in the rare case when $S_t = S_{t-1}$, i.e., $\varepsilon_t = 0$.

Aggregate Earnings as a Predictor of Future Cash Flow

Next period cash flow, CF_{t+1}, equals cash inflows from sales, adjusted for uncollected amounts reflected in the change in accounts receivable, minus outflows from purchases, adjusted for unpaid amounts reflected in the change in accounts payable. That is:

$$CF_{t+1} = (S_{t+1} - \Delta AR_{t+1}) - (P_{t+1} - \Delta AP_{t+1}). \tag{5}$$

Equations (1) through (3) show that equation (5) can be expressed in terms of S_{t+1} and three sales shocks, ε_{t+1}, ε_t, and ε_{t-1}. In particular, DKW shows that:

$$\begin{aligned}CF_{t+1} = {}& \pi S_{t+1} - [\alpha + (1-\pi)\gamma_1 - \beta(1-\pi)]\varepsilon_{t+1}\\ &+ \gamma_1(1-\pi)[\beta + \gamma_2(1-\beta)]\Delta\varepsilon_{t+1} + \beta\gamma_1\gamma_2(1-\pi)\Delta\varepsilon_t.\end{aligned} \tag{6}$$

Because earnings equals cash flow plus accruals, i.e., $EARN_{t+1} = CF_{t+1} + \Delta AR_{t+1} + \Delta INV_{t+1} - \Delta AP_{t+1}$ in the model, and $EARN_{t+1} = \pi S_{t+1}$, the ε terms in equation (6) are accruals.[6] As DKW explains, the second term in equation (6) reflects the permanent change in working capital accruals (accounts receivable plus inventory minus accounts payable) that results from the current sales shock. This term equals the change in working capital accruals only if the entire target inventory adjustment occurs and is paid for in period t + 1. DKW refers to the multiple on ε_{t+1} in the second term as the firm's operating cash cycle, δ, expressed as a fraction of a year. The third and fourth terms in equation (6) reflect the one- and two-year effects on cash flow of cash payments related to the new levels of cost of goods sold and inventory arising from the sales shocks.

DKW ignores the second line of equation (6) to obtain current earnings as the best predictor of next period cash flow, and all future cash flows.[7] However, the second line of equation (6) does not equal 0 in expectation at time t. Specifically, $E_t[\Delta\varepsilon_{t+1}] = -\varepsilon_t$ and $E_t[\Delta\varepsilon_t] = \varepsilon_t - \varepsilon_{t-1}$, where ε_t and ε_{t-1} are the time t and t − 1 realizations of the random variable ε, which only equal 0 by chance. As we show below, including these terms reveals that expected next period cash flow does not equal current earnings, i.e., $EARN_t$ is not an unbiased predictor of CF_{t+1}, and, more importantly, facilitates insights into the incremental role of accruals in predicting future cash flows.

Equation (6) can be used to express expected next period cash flow as a function of current and two lags of earnings. In particular, from equation (6):

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[6] Because $P_{t+1} = (1-\pi)\,S_{t+1} + \Delta INV_{t+1}$, equation (6) can be expressed as $CF_{t+1} = \pi\,S_{t+1} - \Delta AR_{t+1} - \Delta INV_{t+1} + \Delta AP_{t+1}$, which is earnings minus accruals.

[7] From equation (6), ignoring the second line, $E_t[CF_{t+1}] = E_t[\pi S_{t+1} - \delta\,\varepsilon_{t+1}] = E_t[\pi S_t] = EARN_t$, which also suggests that πS_t is an optimal forecast of next period cash flow. The second line of equation (6) does not affect the predicted sign of the correlation between cash flow and earnings, or accruals, which is a primary focus of DKW.

$$E_t[CF_{t+1}] = \pi S_t - \gamma_1(1 - \pi)[\beta + \gamma_2(1 - \beta) - \beta\gamma_2]\varepsilon_t - \beta\gamma_1\gamma_2(1 - \pi)\varepsilon_{t-1}. \tag{7}$$

From equation (1), $\varepsilon_t = \pi^{-1}$ $(EARN_t - EARN_{t-1})$ and $\varepsilon_{t-1} = \pi^{-1}$ $(EARN_{t-1} - EARN_{t-2})$. Thus, current and two lags of earnings provide information about the sales shocks relevant to expected next period cash flow.[8] Substituting EARN variables for the ε terms in equation (7) and rearranging yields equation (8):

$$\begin{aligned} E_t[CF_{t+1}] = {} & (1 - \gamma_1(1 - \pi)\pi^{-1}[\beta + \gamma_2(1 - \beta) - \beta\gamma_2])EARN_t \\ & + \gamma_1(1 - \pi)\pi^{-1}[\beta + \gamma_2(1 - \beta) - 2\beta\gamma_2]EARN_{t-1} \\ & + \gamma_1(1 - \pi)\pi^{-1}\,\beta\gamma_2 EARN_{t-2}. \end{aligned} \tag{8}$$

Equation (8) shows that expected next period cash flow equals current earnings, adjusted for the one- and two-year effects of inventory changes and associated payments. For example, if the two prior years' sales changes, i.e., ε_t and ε_{t-1}, are positive, then $EARN_t$ overstates expected cash flow in period t + 1 because $EARN_t$ omits the future cash flow effects of payments related to delayed inventory increases. In this case, cash flow in period t + 1 will be less than earnings in period t because of payments related to (1) the period t + 1 inventory increase arising from the period t sales increase, (2) the period t accounts payable for the period t inventory increase arising from the period t sales increase, and (3) the period t accounts payable for the period t inventory increase arising from the period t − 1 sales increase.

Cash Flow and Components of Accruals as Predictors of Future Cash Flow

The analysis thus far focuses on using aggregate earnings to predict next period cash flow. However, our objective is to understand the relation between earnings and its components, and future cash flows. We next use the model to derive this relation. Key to understanding this relation is the observation that equation (5) can also be used to express expected next period cash flow in terms of the components of current earnings.

Specifically, using equation (5) to obtain expressions for CF_t and $E_t[CF_{t+1}]$ shows that next period cash flow is expected to differ from current period cash flow because the firm collects the amount of the change in receivables, pays the amount of the change in accounts payable, and pays an amount associated with the change in expected purchases next period. Thus, CF_t is not an unbiased predictor of CF_{t+1}:

$$\begin{aligned} E_t[CF_{t+1}] &= CF_t + \Delta AR_t - \Delta AP_t - (1 - \beta)(E_t[P_{t+1}] - P_t) \\ &= CF_t + \Delta AR_t - \Delta AP_t - (1 - \beta)(E_t[\Delta INV_{t+1}] - \Delta INV_t). \end{aligned} \tag{9}$$

The second line of equation (9) follows from the first by noting that purchases equals cost of goods sold plus the change in inventory and recalling that expected cost of goods sold in period t + 1, $E_t[(1 - \pi)S_{t+1}]$, equals $(1 - \pi)S_t$. To state equation (9) in terms of the components of current earnings, recall from equations (2) and (4) that the sales shock, ε_t, affects current period change in receivables and expected change in inventory next period. Thus, the expected change in inventory can be stated in terms of current change in receivables.

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[8] Because $EARN_t = \pi S_t$, equation (7) can be equivalently stated in terms of current and two lags of sales.

Expressing $E_t[\Delta INV_{t+1}]$ in terms of ΔAR_t and collecting terms yields an expression of expected next period cash flow in terms of the components of current earnings:

$$E_t[CF_{t+1}] = CF_t + (1 - (1 - \beta)\gamma_1\gamma_2(1 - \pi)\alpha^{-1})\Delta AR_t + (1 - \beta)\Delta INV_t - \Delta AP_t. \quad (10)$$

Thus, under the assumptions of the model, expected cash flow can be expressed as a function of either (1) current and two lags of aggregate earnings, as in equation (8), or (2) current earnings disaggregated into cash flow and the components of accruals, as in equation (10). In other words, the model predicts that equations (8) and (10) have equal predictive ability.

In equation (10), the first part of the multiple on ΔAR, i.e., 1, reflects the expected collection next period of the current period change in receivables. The second part of the multiple, i.e., $-(1 - \beta)\gamma_1\gamma_2(1 - \pi)\alpha^{-1}$, reflects the expected payment next period of the expected change in inventory, because the expected change in inventory next period, like the change in accounts receivable, depends on the current period sales shock. The multiple on ΔINV reflects the payment deferred to next period of the current period change in inventory. The multiple on ΔAP reflects the expected change in cash next period associated with the current change in accounts payable. Equation (10) shows that accruals reflect information about expected future cash flows relating to management's expected future purchasing activity, as well as relating to collections and payments associated with current period transactions, i.e., collecting accounts receivable and paying accounts payable. Thus, the predictive ability of accruals for future cash flows is not limited to the "mechanical" delayed cash flow effects of past transactions.[9]

Predictions

The model provides the basis for the predictions we test in Section V. First, equation (8) leads us to predict that current and two lags of aggregate earnings are significant in predicting next period cash flow. Equation (8) includes three earnings variables because the assumed target inventory policy is a two-period phenomenon. However, asset investment policies and related cash payment policies likely differ across short-term assets, such as inventory, and long-term assets, such as property, plant, and equipment. If the policy were longer lived, as one might expect for long-term assets, then equation (8) would include additional lags of earnings. Because firms invest in long-term assets, we expect that earnings lags greater than two also are significant in predicting future cash flows.[10]

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[9] Our predictions assume that managers choose accounting policies to portray accurately the firm's economic situation. To the extent managers choose accounting policies opportunistically, we expect earnings to be a relatively poor predictor of future cash flows, thereby biasing against finding evidence consistent with our predictions. Also, it is possible that components of cash flow could enhance the predictive ability of aggregate cash flow for future cash flows, just as components of earnings enhance the predictive ability of aggregate earnings. However, such components are available only for the relatively few firms using the direct method under Statement of Financial Accounting Standards No. 95. Moreover, because accruals inherently incorporate information about future cash flows, whereas past cash flow does not, it would not be surprising to find that accruals enhance the predictive ability of disaggregated cash flow.

[10] This can be seen by noting that equation (8) includes one more EARN term than the sales shock affecting cash flow next period. In the modeled case of a two-period investment policy, the sales shock from period $t - 1$ affects period $t + 1$ cash flow. Thus, $EARN_{t-2}$ is included in equation (8). In the case of a six-period investment policy, the sales shock from period $t - 5$ affects period $t + 1$ cash flow. Thus, $EARN_{t-6}$ would be included in equation (8).

An equation analogous to equation (8) using current and lagged cash flows as predictor variables would include an infinite number of lags of cash flow. Even if the only accrual relates to accounts receivable, if the series of changes in cash flows is invertible, i.e., $\alpha < \pi/2$, then expected cash flow equals an infinite series of past cash flows. Relatedly, as an additional analysis in Section VI, we investigate the explanatory power of current and lagged aggregate and disaggregated earnings for cash flows up to four years into the future.

Second, equation (10) leads us to predict that current earnings, disaggregated into cash flow and the major components of accruals, has the same predictive ability for future cash flows as current and two lags of aggregate earnings. This prediction derives from the different prediction equation weights on cash flow and the accrual components. Although the weights depend on the magnitudes of model parameters, the weights would be equal, in absolute value, only if there were no accounts payable, i.e., $\beta = 0$, *and* either there were no inventory, i.e., $\gamma_1 = 0$, or there were no delayed inventory adjustment, i.e., $\gamma_2 = 0$. This prediction is equivalent to the prediction that the components of accruals add to cash flow in predicting next period cash flow.

Third, equation (10) permits us to predict the sign of the weights on each earnings component. Specifically, we predict that the weights on CF and ΔINV are positive and the weight on ΔAP is negative. The sign of the weight on ΔAR depends on the magnitudes of model parameters β, γ_1, γ_2, and π in equation (10). Thus, we calculate firm-specific estimates of these parameters, as in DKW, and then calculate the expression in equation (10) to predict the sign of the weight on ΔAR. Because untabulated statistics reveal that the expression is positive for all sample firms with data sufficient for its calculation, we predict that the weight on ΔAR is positive.

Although we predict the signs of the weights on the earnings components, we do not predict their magnitudes because, although the model captures the essence of accruals, it is based on several simplifying assumptions. For example, the model assumes only three current accruals with relatively simple time-series processes. Also, the model does not include long-term accruals; the empirical tests include them because they are components of earnings for sample firms. In developing expectations for the signs of the weights on long-term accruals, specifically depreciation and amortization, we note that the model focuses on predicting future operating cash flows, which do not include expenditures related to long-term investments. Such investments might include the purchase of property, plant, and equipment or intangible assets. Presumably, a firm makes such investments because they are expected to generate, over multiple future periods, higher cash flows than would be generated from the firm's previously existing asset base. Depreciation and amortization are intended to match the costs of the investments to their benefits. If matching is achieved and the investment earns a positive return, then the cash inflows associated with the investment will exceed its depreciation or amortization in each period, even if the rate of return is lower than the firm's cost of capital. Thus, consistent with Feltham and Ohlson (1996), we expect that future operating cash flows are positively related to depreciation and to amortization, and predict that the weights on depreciation and amortization are positive.

IV. ESTIMATION EQUATIONS

The first set of tests relates to the predictive ability of current and past aggregate earnings for future cash flows, and is based on the following equation:

$$\mathrm{CF}_{i,t+1} = \phi + \sum_{\tau=0}^{k} \phi_{t-\tau}\, \mathrm{EARN}_{i,t-\tau} + u_{i,t}, \tag{11}$$

where i and t denote firm and year, and k ranges from 0 to 6. Based on equation (8), we predict that ϕ_t, ϕ_{t-1}, and ϕ_{t-2} are significantly different from 0.[11] For the reasons set forth in Section III, we estimate equation (11) using up to six lags of EARN and expect that at least some ϕ_{t-k} are significantly different from 0 for $k > 2$. We use up to six lags of earnings because this results in the same number of explanatory variables in equation (11) as in the accrual components equation (12), ensuring that any difference in explanatory power is not attributable solely to the number of explanatory variables.

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[11] Although intuition suggests the earnings coefficients should be positive and decline with longer lags, this is not predictable from equation (8). Thus, we do not predict the signs or relative magnitudes of the coefficient estimates.

The second set of tests disaggregates earnings into its major components:

$$\begin{aligned} CF_{i,t+1} = {} & \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} \\ & + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}, \end{aligned} \tag{12}$$

where DEPR is depreciation expense, AMORT is amortization expense, and OTHER is the aggregate of other accruals, i.e., $OTHER \equiv EARN - (CF + \Delta AR + \Delta INV - \Delta AP - DEPR - AMORT)$.[12]

As explained in Section III, we predict that equation (12) has the same predictive ability as equation (11) estimated using current and two lags of EARN. We also predict that the coefficients on the accrual components in equation (12) differ from each other and from that on cash flow. That is, the components of accruals add to cash flow in predicting future cash flows. We also predict that ϕ_{CF}, ϕ_{AR}, ϕ_{I}, ϕ_{D}, and ϕ_{AM} are positive, and ϕ_{AP} is negative. We have no prediction for ϕ_{O}.

Tests of predictions comparing the explanatory power of equations (11) and (12) are based on a Vuong (1989) Z-statistic. Tests of predictions relating to differences in coefficients in equation (12) are based on F-tests of coefficient equality. Results associated with other tests of coefficient constraints provide additional insights into the predictive ability of earnings components and facilitate comparing the predictive abilities of cash flow and aggregate earnings, as in prior research. In particular, constraining the coefficients on cash flow and the accrual components to be equal with signs implicit in EARN is equivalent to including only aggregate earnings in equation (12). Constraining the coefficients on the accrual components to equal 0 is equivalent to including only cash flow in equation (12). Similarly, constraining the coefficient on cash flow to equal 0 is equivalent to including only the accrual components in equation (12).

V. DATA AND EMPIRICAL RESULTS

Data and Descriptive Statistics

Data are from the 1997 Compustat annual industrial and research files. The sample spans 1987–1996 because the analyses require at least one year of future cash flows and use cash from operations reported under Statement of Financial Accounting Standards No. 95 (SFAS No. 95).[13] EARN is income before extraordinary items and discontinued operations, and CF is net cash flow from operating activities, adjusted for the accrual portion of extraordinary items and discontinued operations. The accrual components are from the statement of cash flows, when available, and calculated from balance sheet data otherwise. Following Sloan (1996), all variables are deflated by average total assets.[14]

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[12] The accruals disaggregation follows the model in Section III. An alternative disaggregation follows the line items typically reported in firms' income statements, i.e., sales, cost of goods sold (CGS), selling, general, and administrative expenses (SGA), DEPR, AMORT, and OTHER. The two alternatives are closely related in that change in receivables typically relates to sales, change in inventory relates to CGS, and change in accounts payable relates to CGS and SGA. Not surprisingly, our inferences are unaffected by using this alternative disaggregation.

[13] SFAS No. 95 requires firms to present a statement of cash flows for fiscal years ending after July 15, 1988 (FASB 1987). Our sample begins in 1987 because some firms early-adopted SFAS No. 95. We predict cash flows for 1988–1997, depending on the length of the prediction horizon and the number of lagged predictors in the equation.

The sample excludes financial services firms (SIC codes 6000–6999) because the model is not developed to reflect their activities. It also excludes observations with sales less than \$10 million, share price less than \$1, EARN or CF in the extreme upper and lower 1 percent of their respective distributions, and studentized residuals greater than 3 in absolute value.[15] Because we seek to compare the findings from equation (11) for $k = 2$ and equation (12), sample firms in the primary analyses must have data sufficient for estimating these two specifications. These criteria result in a primary sample of 10,164 firm-year observations.

Table 1 presents descriptive statistics for the variables used in the estimation equations. Panel A reports distributional statistics and Panel B reports Pearson and Spearman correlations. Consistent with prior research, e.g., Sloan (1996), Panel A reveals that the means and medians of EARN and CF are positive and those of aggregate accruals, ACCRUALS = EARN − CF, are negative. The negative mean and median for ACCRUALS reflect the fact that aggregate accruals includes depreciation and amortization, but acquisition of depreciable and amortizable assets is an investing, not operating, activity under SFAS No. 95. Also consistent with Sloan (1996), current accruals, i.e., ΔAR, ΔINV, and ΔAP, are smaller in magnitude and more variable than DEPR, a long-term accrual. Finally, less than one-half of the sample firms report amortization expense, as evidenced by a median AMORT of 0.00.[16]

Panel B of Table 1 reveals that, as expected, EARN is significantly positively correlated with CF and ACCRUALS, and CF and ACCRUALS are significantly negatively correlated.[17] With the exception of AMORT, the accrual components are individually significantly correlated with EARN and CF, and generally are also correlated with each other. Untabulated statistics indicate that EARN, ACCRUALS, and CF are significantly autocorrelated. The persistence of CF, 0.47, is substantially greater than that of ACCRUALS, 0.26, consistent with prior research such as Sloan (1996) and Barth et al. (1999). The persistence of EARN, 0.66, exceeds those of ACCRUALS and CF.[18]

Results: Aggregate Earnings

Table 2 presents regression summary statistics from estimating equation (11), which tests the predictive ability of current and past aggregate earnings for next period cash flow. The results reveal that current earnings, EARN_t, is significant in predicting one-year-ahead

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[14] Our variable definitions follow DKW, except that DKW calculates cash from operations from balance sheet and income statement amounts. Also, DKW deflates by the number of shares outstanding. Section VI reports that our inferences are unaffected by the source of cash from operations or the choice of deflator.

[15] Our inferences are unaffected by eliminating observations based on any of the stated criteria.

[16] If amortization expense is missing, then AMORT equals total depreciation and amortization minus depreciation and minus depletion; if depletion is missing and the firm is not in an industry for which depletion is common, i.e., SIC codes 1000–1499, 2900–2999, and 4600–4699, then we set depletion equal to 0. Depletion is included in OTHER.

[17] Throughout, the term "significant" refers to statistical significance at less than the 0.05 level.

[18] The statistics in Table 1 differ somewhat from those in some prior studies, e.g., Dechow (1994), Sloan (1996), DKW, and Barth et al. (1999), but are consistent with those in others, e.g., Burgstahler et al. (1998). For example, we report that the standard deviations of EARN, CF, and ACCRUALS are similar, whereas Dechow (1994) and DKW find that earnings is less variable than cash flow. Untabulated statistics reveal that the differences are primarily attributable to the definition of accruals, sample selection, and deflators. Despite these differences in descriptive statistics, Section VI reports that our inferences are robust to these choices.

TABLE 1
Descriptive Statistics on Earnings, Cash from Operations, and Accruals
Sample of 10,164 Firm-Year Observations, 1987–1996

Panel A: Distributional Statistics

Variable	*Mean*	*Median*	*Std. Dev.*
EARN	0.04	0.04	0.08
CF	0.08	0.09	0.08
ACCRUALS	−0.04	−0.04	0.08
ΔAR	0.01	0.01	0.05
ΔINV	0.01	0.01	0.05
ΔAP	0.01	0.01	0.04
DEPR	0.05	0.04	0.03
AMORT	0.01	0.00	0.02
OTHER	−0.01	−0.01	0.05

Panel B: Pearson (Spearman) Correlations Above (Below) the Diagonal

Variable	*EARN*	*CF*	*ACCRUALS*	*ΔAR*	*ΔINV*	*ΔAP*	*DEPR*	*AMORT*	*OTHER*
EARN		0.48*	0.44*	0.26*	0.24*	0.12*	−0.05*	−0.04*	0.27*
CF	0.51*		−0.58*	−0.19*	−0.30*	0.11*	0.26*	−0.01	−0.22*
ACCRUALS	0.29*	−0.58*		0.44*	0.53*	−0.01	−0.32*	−0.04*	0.48*
ΔAR	0.27*	−0.13*	0.40*		0.19*	0.43*	−0.03*	0.01	−0.16*
ΔINV	0.25*	−0.21*	0.47*	0.21*		0.37*	−0.06*	−0.01	−0.01
ΔAP	0.16*	0.13*	−0.02*	0.40*	0.30*		−0.01	−0.01	0.02*
DEPR	−0.02*	0.32*	−0.41*	−0.04*	−0.05*	0.01*		−0.49*	0.01
AMORT	−0.01	0.01	−0.03*	0.03*	−0.02*	−0.03	−0.12*		−0.01
OTHER	0.09*	−0.26*	0.41*	−0.08*	0.01	0.02*	−0.04*	−0.04*	

(Continued on next page)

TABLE 1 (Continued)

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* Correlation significant at the 0.05 level.

The variables are defined as follows (Compustat data items in parentheses):

EARN = income before extraordinary items and discontinued operations (#18);

CF = net cash flow from operating activities (#308) less the accrual portion of extraordinary items and discontinued operations reported on the statement of cash flows (#124);

ACCRUALS = total operating accruals, calculated as EARN minus CF;

ΔAR = change in accounts receivable per the statement of cash flows (#302);

ΔINV = change in inventory per the statement of cash flows (#303);

ΔAP = change in accounts payable and accrued liabilities per the statement of cash flows (#304);

DEPR = depreciation expense (#103);

AMORT = amortization expense (#65); and

OTHER = net of all other accruals, calculated as EARN $-$ (CF + ΔAR + ΔINV $-$ ΔAP $-$ DEPR $-$ AMORT).

If Compustat data items #302, #303, or #304 are missing, then ΔAR, ΔINV, and ΔAP are calculated as the change in the applicable balance sheet account, accounts receivable (#2), inventory (#3), and accounts payable (#70) plus accrued expenses (#153), respectively. If Compustat data item #65 is missing, then AMORT equals total depreciation and amortization (#14) minus depreciation (#103) and minus depletion (#174); if depletion is missing and the firm is not in an industry for which depletion is common, i.e., SIC codes 1000–1499, 2900–2999, and 4600–4699, then we set depletion equal to 0. All variables are deflated by the average book value of total assets (#6).

TABLE 2
Summary Statistics from Regressions of Future Cash Flow on Current and Past Aggregate Earnings
Sample of Compustat Firms 1987–1996

$$CF_{i,t+1} = \phi + \sum_{\tau=0}^{k} \phi_{t-\tau} EARN_{i,t-\tau} + u_{i,t}$$

	Current		*Current and One Lag*		*Current and Two Lags*		*Current and Three Lags*		*Current and Four Lags*		*Current and Five Lags*		*Current and Six Lags*	
Variable	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Intercept	0.07	81.16	0.07	77.24	0.06	73.30	0.06	68.83	0.06	64.22	0.06	59.68	0.06	54.91
$EARN_t$	0.42	42.98	0.35	30.31	0.33	29.06	0.33	27.47	0.33	25.98	0.33	24.22	0.33	22.82
$EARN_{t-1}$			0.12	11.59	0.07	6.60	0.08	7.03	0.08	6.33	0.09	6.74	0.09	6.08
$EARN_{t-2}$					0.10	9.84	0.07	5.47	0.07	5.28	0.06	4.30	0.06	4.17
$EARN_{t-3}$							0.06	5.32	0.05	3.99	0.05	3.43	0.04	2.92
$EARN_{t-4}$									0.03	2.47	0.02	1.14	0.01	0.92
$EARN_{t-5}$											0.04	3.31	0.04	2.51
$EARN_{t-6}$													0.02	1.94
Adj. R^2	0.15		0.16		0.17		0.18		0.18		0.19		0.19	
n	10,164		10,164		10,164		9,250		8,491		7,821		7,213	

See Table 1 for variable definitions.

cash flow, CF_{t+1}, explaining 15 percent of its variation. However, the results also reveal that, consistent with predictions, additional lags of earnings are significant in predicting next period cash flow. Consistent with the model and equation (8), we find that current and two lags of earnings are significant in the prediction equation, explaining 17 percent of the variation in next period cash flow. In fact, up to six lags of earnings are significant in predicting next period cash flow, consistent with long-lived asset investment policies being omitted from the model. The adjusted R^2s increase monotonically from 0.15 for the specification with current earnings only to 0.19 for the specification with current and six lags of earnings. Untabulated statistics indicate that the EARN coefficients significantly differ from one another in each specification. Taken together, these results indicate that aggregate current earnings is not an unbiased predictor of future cash flows, permitting a role for accruals in predicting future cash flows as the model predicts.

Results: Cash Flow and Components of Accruals

Table 3 presents summary statistics from estimating equation (12), which disaggregates current earnings into cash flow and the major components of accruals. Panel A reveals that, as predicted, the six accrual components are all significant in predicting next period cash flow, with signs consistent with predictions; the t-statistics range in absolute value from 10.54 to 28.58.[19] The significance of the DEPR and AMORT coefficients is inconsistent with assertions in the financial press that depreciation and amortization are not predictive of future cash flows.

Comparing the adjusted R^2s associated with the specification with current and two lags of aggregate earnings in Table 2, 0.17, and disaggregated current earnings in Panel A of Table 3, 0.35, reveals that the disaggregated earnings specification has substantially more predictive ability. An untabulated Vuong (1989) Z-statistic indicates that this difference is significant. The model predicts that the predictive abilities of these two specifications are the same. Thus, this finding suggests that the model's focus on working capital accruals and its other simplifying assumptions understate the predictive ability of current cash flow and the components of accruals relative to current and two lags of aggregate earnings. We investigate below the extent to which the superior predictive ability of disaggregated current earnings is attributable to (1) disaggregating cash flow from aggregate accruals, or (2) disaggregating accruals into its major components.

Untabulated statistics associated with comparisons of the adjusted R^2s of the disaggregated current earnings specification to each specification in Table 2 reveal that disaggregated current earnings has significantly more predictive ability than up to seven years of aggregate earnings. This result indicates that the higher adjusted R^2 in Panel A of Table 3 is not merely attributable to a larger number of explanatory variables in the disaggregated earnings specification.

Panel A of Table 3 also presents results from tests of coefficient restrictions comparing the explanatory power of disaggregated earnings (Unrestricted) to cash flow (CF only), aggregate earnings (EARN only), and the accrual components (Accrual components only). As predicted, all coefficients on the accrual components significantly differ from 0, and, thus, the unrestricted specification has significantly more predictive ability than the CF-only specification. Also as predicted, the coefficients on cash flow and the six accrual components significantly differ. Thus, disaggregating earnings significantly enhances

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[19] Untabulated findings reveal that some coefficients on up to four lags of the predictor variables differ significantly from 0.

TABLE 3
Summary Statistics from Regressions of Future Cash Flow on Current Cash Flow and Components of Accruals Sample of Compustat Firms 1987–1996

Panel A: Regression Summary Statistics, All Variables Deflated by Average Total Assets

$$CF_{i,t+1} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

Variable	*Prediction*	*Coefficient*	*t-statistic*
Intercept	?	0.01	7.89
CF_t	+	0.59	61.34
ΔAR_t	+	0.42	28.10
ΔINV_t	+	0.35	21.75
ΔAP_t	−	−0.56	−28.58
$DEPR_t$	+	0.42	16.39
$AMORT_t$	+	0.47	11.05
$OTHER_t$	?	0.15	10.54
Adj. R^2		0.35	
n		10,164	
Tests of coefficient restrictions:		*Adj. R^2*	*p-value*
Unrestricted		0.35	
CF only		0.24	<0.01
EARN only		0.15	<0.01
Accrual components only		0.11	<0.01

Panel B: Regression Summary Statistics, All Variables Undeflated

$$CF\_U_{i,t+1} = \sum_i \phi_i + \sum_t \phi_t + \phi_{CF}CF\_U_{i,t} + \phi_{AR}\Delta AR\_U_{i,t} + \phi_{I}\Delta INV\_U_{i,t} + \phi_{AP}\Delta AP\_U_{i,t} + \phi_{D}DEPR\_U_{i,t} + \phi_{AM}AMORT\_U_{i,t} + \phi_{O}OTHER\_U_{i,t} + u_{i,t}$$

Variable	*Prediction*	*Coefficient*	*t-statistic*
CF_U_t	+	0.54	39.37
ΔAR_U_t	+	0.67	25.82
ΔINV_U_t	+	0.15	5.01
ΔAP_U_t	−	−0.28	−10.02
$DEPR\_U_t$	+	0.76	25.43
$AMORT\_U_t$	+	1.78	11.98
$OTHER\_U_t$	?	0.32	21.25
Adj. R^2		0.956	
n		10,164	
Tests of coefficient restrictions:		*Adj. R^2*	*p-value*
Unrestricted		0.956	
CF only		0.945	<0.01
EARN only		0.936	<0.01
Accrual components only		0.947	<0.01

See Table 1 for variable definitions.

_U denotes variables are undeflated. p-values associated with F-tests of coefficient restrictions as follows: CF only ($\phi_{AR} = \phi_I = -\phi_{AP} = \phi_D = \phi_{AM} = \phi_O = 0$), EARN only ($\phi_{CF} = \phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), and Accrual components only ($\phi_{CF} = 0$).

predictive ability relative to aggregate earnings.[20] Panel A also indicates that the adjusted R^2 of the CF-only specification exceeds that of the EARN-only specification; an untabulated Vuong (1989) Z-statistic indicates that the difference is significant. Finally, the accrual components alone have the least predictive ability for next period cash flow.

Panel B of Table 3 presents results from estimating equation (12) using undeflated variables and including fixed firm and year effects. Estimating this equation ensures that our findings are not attributable to scaling by contemporaneous average total assets. The inferences drawn from Panel B are similar to those drawn from Panel A, although, as is typical when estimating undeflated specifications, the level of the adjusted R^2s is higher.

Consistent with Panel A, the six accrual components are all significant in predicting one-year-ahead cash flow. In addition, untabulated findings indicate that the adjusted R^2 from a fixed-effects specification with current and two lags of aggregate earnings is 0.937, which is lower than 0.956 from the disaggregated current earnings specification. The results from tests of coefficient restrictions in Panel B are also generally consistent with those in Panel A in that the unrestricted specification has the most predictive ability and the predictive ability of the CF-only specification exceeds that of the EARN-only specification. The only difference between the findings in Panels A and B is that in Panel B the specification with accrual components only has more predictive ability than either CF only or EARN only. Because our primary inferences are insensitive to deflation and to facilitate comparison to prior related research that typically estimates deflated specifications, henceforth we tabulate only findings from deflated specifications.

Results: Cash Flow and Aggregate Accruals

The model predicts that current and two lags of aggregate earnings has the same predictive ability as disaggregated current earnings. However, the results in Tables 2 and 3 indicate that the latter specification has significantly more predictive ability. We estimate equation (13) to investigate whether the higher adjusted R^2 for the disaggregated earnings specification is attributable to (1) disaggregating cash flow and aggregate accruals, or (2) disaggregating the major accrual components:

$$CF_{i,t+1} = \phi + \sum_{\tau=0}^{k} \phi_{CF,t-\tau}\, CF_{i,t-\tau} + \sum_{\tau=0}^{k} \phi_{A,t-\tau}\, ACCRUALS_{i,t-\tau} + u_{i,t}, \tag{13}$$

where aggregate accruals, ACCRUALS, equals $\Delta AR + \Delta INV - \Delta AP - DEPR - AMORT + OTHER$ and, for the sake of parsimony, $k \leq 3$.

Table 4 presents the findings. It reveals that for all specifications, the CF coefficients are significantly positive and current aggregate accruals, $ACCRUALS_t$, adds significantly to cash flow in predicting next period cash flow. For specifications including more than two years of predictor variables, lagged ACCRUALS has no significant explanatory power incremental to cash flow and current ACCRUALS. The adjusted R^2s increase monotonically from 0.27 to 0.35 as additional lags of cash flow and aggregate accruals are included.

Comparing the predictive ability of multiple lags of CF and ACCRUALS to the unrestricted specification with only year t variables estimated on the same sample indicates that

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[20] Because we do not predict the sign of ϕ_O and predict the sign of ϕ_{AR} based on empirical estimation, we test the coefficient restrictions excluding one or both of these coefficients. Untabulated results reveal the same inferences as when including these coefficients. Untabulated tests also reveal that the four current accruals coefficients are not all equal; we cannot reject the hypothesis that the two long-term accruals coefficients are equal.

TABLE 4

Summary Statistics from Regressions of Future Cash Flow on Current and Past Cash Flows and Current and Past Accruals Sample of Compustat Firms 1987–1996

$$CF_{i,t+1} = \phi + \sum_{\tau=0}^{k} \phi_{CF,t-\tau} CF_{i,t-\tau} + \sum_{\tau=0}^{k} \phi_{A,t-\tau} ACCRUALS_{i,t-\tau} + u_{i,t}$$

	Current		Current and One Lag		Current and Two Lags		Current and Three Lags	
Variable	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Intercept	0.04	45.31	0.04	34.28	0.03	26.55	0.03	20.10
CF_t	0.60	59.48	0.48	36.84	0.44	32.40	0.44	28.46
CF_{t-1}			0.19	16.15	0.11	8.06	0.12	7.63
CF_{t-2}					0.17	13.68	0.13	8.30
CF_{t-3}							0.06	4.68
$ACCRUALS_t$	0.22	21.19	0.16	13.16	0.15	12.52	0.16	11.59
$ACCRUALS_{t-1}$			0.03	2.70	−0.01	−0.89	0.01	0.24
$ACCRUALS_{t-2}$					0.01	1.00	−0.01	−0.98
$ACCRUALS_{t-3}$							−0.01	−0.74
Adj. R^2	0.27		0.30		0.33		0.35	
n	10,164		9,076		7,944		6,162	

Tests comparing explanatory power:

	Current		Current and One Lag		Current and Two Lags		Current and Three Lags	
	Adj. R^2	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*
Unrestricted (year t only)	0.35		0.35		0.35		0.36	
CF and ACCRUALS	0.27	<0.01	0.30	<0.01	0.33	<0.01	0.35	<0.05
CF only	0.24	<0.01	0.28	<0.01	0.32	<0.01	0.33	<0.01
EARN only	0.15	<0.01	0.17	<0.01	0.18	<0.01	0.19	<0.01
ACCRUALS only	0.02	<0.01	0.03	<0.01	0.04	<0.01	0.04	<0.01

See Table 1 for variable definitions.

p-values are based on Vuong's (1989) Z-statistic comparing the explanatory power of the unrestricted specification with year t cash flow and six accrual components to the following specifications for k = 0 to 3: CF and ACCRUALS, CF only ($\phi_{A,t-k} = 0$), EARN only ($\phi_{CF,t-k} = \phi_{A,t-k}$), and ACCRUALS only ($\phi_{CF,t-k} = 0$).

current cash flow and the accrual components have significantly more predictive ability than up to four years of CF and ACCRUALS. However, the significance of the difference between the two specifications declines with the inclusion of more lagged variables, and untabulated findings reveal that the difference is insignificant in a specification including current and four lags of CF and ACCRUALS. Recall from Tables 2 and 3 that current and six lags of aggregate earnings have significantly less predictive ability than current earnings disaggregated into cash flow and the components of accruals. The findings in Table 4 reveal that the superior predictive ability of disaggregated current earnings relative to multiple lags of aggregate earnings derives from disaggregating cash flow from aggregate accruals, as well as from disaggregating the components of accruals.

VI. ADDITIONAL ANALYSES

Operating Cash Cycle

The model in Section III is based on a single firm, whereas the estimation equations are cross-sectional. Thus, differences in model parameters across firms could affect our inferences. DKW shows that the predictive ability of earnings for future cash flows depends on the firm's operating cash cycle, δ. This is because, as the first line of equation (6) shows, the difference between realized CF_{t+1} and $EARN_t$ depends on accruals, as reflected in δ, where $\delta = [\alpha + (1 - \pi)\gamma_1 - \beta(1 - \pi)]$. To investigate whether the incremental predictive ability of disaggregated accruals is robust to controlling for δ, we repeat our analyses after partitioning firms into δ-quartiles, as in DKW.[21]

Table 5, Panel A, presents descriptive statistics for δ. The full sample distribution is comparable to that in DKW. The statistics reveal that partitioning firms into quartiles substantially reduces the variation in δ relative to the full sample, especially for the first three portfolios. Table 5, Panel B, presents regression summary statistics from estimating the disaggregated earnings specification by δ-quartile. The findings are consistent with those in Table 3, indicating that the Table 3 results are not solely attributable to differences in δ. In particular, in each of the four δ-quartile portfolios all accrual component coefficients have predicted signs and differ significantly from 0, with the exception of AMORT in quartile 1. Finally, in each of the four portfolios the results of tests of various coefficient restrictions in Panel C are consistent with those in Table 3.

Industry Membership

Because the types and mix of accruals likely vary by industry, we also estimate the disaggregated earnings specification for 13 industries identified by Barth et al. (1998). Table 6 presents the findings. Panel A reports descriptive statistics on operating cash cycle, δ, by industry. Not surprisingly, δ varies substantially across industries. The substantial variation in δ within industries reveals that operating cash cycle and industry membership are not perfectly correlated. For eight of the 13 industries the interquartile range of δ exceeds the maximum interquartile range of 0.12 for the four δ portfolios in Table 5, Panel A.

Panel B of Table 6 presents summary statistics from equation (12) estimated by industry. It reveals substantial variation across industries in the predictive abilities of cash flow and the accrual components; the adjusted R^2s range from 0.76 to 0.12. However, the separate-industry findings are largely consistent with those in Table 3. The coefficients on CF,

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[21] As in DKW, $\alpha = (AR_t + AR_{t-1}) \div 2\,S_t$, $\beta = (AP_t + AP_{t-1}) \div 2\,S_t\,(1 - \pi)$, $\pi = E_t \div S_t$, averaged across the number of years for which data are available, and $\gamma_1 = g_1 \div (1 - \pi)$, where g_1 is the estimated coefficient on S_t in a regression of INV_t on S_t and ΔS_t. Thus, δ is average days accounts receivable and inventory minus average days accounts payable. DKW interprets δ as a fraction of a year; multiplying δ by 360 permits interpretation of δ in terms of days. Estimating firm-specific inventory regressions requires at least five years of data.

TABLE 5
Summary Statistics from Regressions of Future Cash Flow on Current Cash Flow and Components of Accruals, by Quartiles Formed Based on Estimated Operating Cash Cycle
Sample of Compustat Firms 1987–1996

$$CF_{i,t+1} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

Panel A: Descriptive Statistics on Operating Cash Cycle, δ

	Full Sample	*Quartile 1*	*Quartile 2*	*Quartile 3*	*Quartile 4*
Mean	0.22	0.06	0.16	0.24	0.41
Median	0.20	0.07	0.15	0.24	0.37
Std. Dev.	0.15	0.04	0.02	0.03	0.13
Interquartile Range	0.17	0.06	0.04	0.04	0.12
n	2,723	680	681	681	681

Panel B: Regression Summary Statistics

		Quartile 1		*Quartile 2*		*Quartile 3*		*Quartile 4*	
Variable	*Prediction*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Intercept	?	0.02	7.86	0.02	7.43	0.02	6.65	0.02	5.30
CF_t	+	0.72	46.25	0.58	33.84	0.54	30.44	0.41	20.89
ΔAR_t	+	0.57	17.21	0.40	14.61	0.31	11.67	0.26	9.60
ΔINV_t	+	0.40	12.44	0.36	11.03	0.31	10.36	0.17	6.41
ΔAP_t	−	−0.60	−18.50	−0.57	−15.90	−0.46	−12.24	−0.40	−9.58
$DEPR_t$	+	0.25	7.83	0.35	7.89	0.36	7.13	0.35	4.74
$AMORT_t$	+	0.14	1.45	0.43	2.64	0.38	1.84	0.41	4.94
$OTHER_t$	?	0.15	6.42	0.11	3.99	0.11	4.59	0.09	3.43
Adj. R^2		0.59		0.39		0.31		0.17	
n		2,304		2,422		2,601		2,635	

(Continued on next page)

TABLE 5 (Continued)

$$CF_{i,t+1} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

Panel C: Tests of Coefficient Restrictions

	Quartile 1		*Quartile 2*		*Quartile 3*		*Quartile 4*	
	Adj. R^2	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*
Unrestricted	0.59		0.39		0.31		0.17	
CF and ACCRUALS	0.51	<0.01	0.31	<0.01	0.26	<0.01	0.14	<0.01
EARN only	0.26	<0.01	0.17	<0.01	0.12	<0.01	0.07	<0.01
CF only	0.49	<0.01	0.29	<0.01	0.23	<0.01	0.12	<0.01
Accrual components only	0.21	<0.01	0.10	<0.01	0.06	<0.01	0.03	<0.01

See Table 1 for variable definitions.

p-values are associated with F-tests of coefficient restrictions as follows: CF and ACCRUALS ($\phi_{AR} = \phi_{I} = -\phi_{AP} = -\phi_{D} = -\phi_{AM} = \phi_{O}$), EARN only ($\phi_{CF} = \phi_{AR} = \phi_{I} = -\phi_{AP} = -\phi_{D} = -\phi_{AM} = \phi_{O}$), CF only ($\phi_{AR} = \phi_{I} = \phi_{AP} = \phi_{D} = \phi_{AM} = \phi_{O} = 0$), and Accrual components only ($\phi_{CF} = 0$). Quartile 1–Quartile 4 are first through fourth quartiles of firms ranked according to their operating cash cycles, δ, estimated following DKW, as $[\alpha + (1 - \pi)\,\gamma_1 - \beta\,(1 - \pi)]$, where:

$\alpha = (AR_t + AR_{t-1}) \div 2\,S_t$;

$\beta = (AP_t + AP_{t-1}) \div 2\,S_t\,(1 - \pi)$;

$\pi = E_t \div S_t$, averaged across the number of years for which data are available; and

$\gamma_1 = g_1 \div (1 - \pi)$, where g_1 is the estimated coefficient on S_t in a regression of INV_t on S_t and ΔS_t. Estimating the firm-specific inventory regression requires five years of data.

S is sales (Compustat data item #12), and Δ denotes annual change.

δ is expressed as a fraction of a year. Multiplying δ by 360 gives the operating cash cycle in terms of days.

TABLE 6
Summary Statistics from Regressions of Future Cash Flow on Current Cash Flow and Components of Accruals, by Industry Sample of Compustat Firms 1987–1996

$$CF_{i,t+1} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

Panel A: Descriptive Statistics on Operating Cash Cycle, δ

Industry	*n*	*Mean*	*Median*	*Std. Dev.*	*Interquartile Range*
Transportation	583	0.10	0.09	0.08	0.08
Utilities	805	0.12	0.11	0.06	0.06
Services	816	0.15	0.15	0.12	0.17
Retail	1,365	0.16	0.14	0.13	0.18
Food	356	0.18	0.16	0.14	0.09
Extractive	62	0.18	0.18	0.07	0.06
Textiles & printing/publishing	932	0.21	0.18	0.12	0.14
Chemicals	446	0.23	0.23	0.09	0.11
Computers	1,113	0.25	0.23	0.12	0.13
Pharmaceuticals	234	0.32	0.30	0.10	0.14
Mining & construction	159	0.32	0.22	0.30	0.16
Durable manufacturers	3,057	0.30	0.28	0.13	0.15
Agriculture	47	0.39	0.33	0.16	0.23
All	9,975	0.22	0.20	0.14	0.17

(*Continued on next page*)

TABLE 6 (Continued)

$$CF_{i,t+1} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

Panel B: Regression Summary Statistics

Industry	*n*	*Intercept*	CF_t	ΔAR_t	ΔINV_t	ΔAP_t	$DEPR_t$	$AMORT_t$	OTH_t	*Adj.* R^2
Prediction		?	+	+	+	−	+	+	?	
Transportation	583	0.01*	0.75*	0.59*	0.39*	−0.69*	0.25*	0.06	0.12*	0.76
Utilities	805	0.03*	0.41*	0.22*	0.08	−0.37*	0.51*	−1.42†	0.17*	0.27
Services	816	0.02*	0.58*	0.23*	−0.10	−0.34*	0.26*	0.08	0.11*	0.37
Retail	1,365	0.00	0.59*	0.38*	0.36*	−0.61*	0.65*	0.30	0.37*	0.39
Food	356	0.02*	0.56*	0.61*	0.70*	−0.70*	0.28*	0.65	0.28*	0.33
Extractive	62	0.03*	0.54*	1.05*	−0.40	−0.75*	0.05	−0.00	−0.30*	0.68
Textiles & printing/publishing	932	0.02*	0.56*	0.50*	0.33*	−0.67*	0.45*	0.40*	0.12*	0.35
Chemicals	446	0.01*	0.60*	0.23*	0.41*	−0.36*	0.41*	0.37	0.00	0.45
Computers	1,113	0.02*	0.53*	0.38*	0.15*	−0.39*	0.37*	0.94*	0.08*	0.30
Pharmaceuticals	234	0.02	0.66*	0.34*	0.18	−0.38*	0.34	0.76	0.15*	0.43
Mining & construction	159	0.02	0.45*	0.26*	−0.01	−0.15	0.37	1.49	0.25*	0.32
Durable manufacturers	3,057	0.01*	0.49*	0.31*	0.27*	−0.48*	0.60*	0.65*	0.11*	0.26
Agriculture	47	0.01	0.82*	1.42*	1.08*	−1.85*	−1.10	8.33	1.08*	0.12
# as predicted			13*	13*	10*	13*	12*	11*		
Z1		10.73	55.22	22.58	13.42	−23.37	4.97	13.68	9.70	
Z2		17.15	23.87	25.83	11.78	−21.71	6.62	14.94	14.17	

(*Continued on next page*)

TABLE 6 (Continued)

$$CF_{i,t+1} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

Panel C: Tests of Coefficient Restrictions

		Unrestricted	*CF and ACCRUALS*		*EARN only*		*CF only*		*Accrual Components Only*	
Industry	*n*	*Adj.* R^2	*Adj.* R^2	*p-value*	*Adj.* R^2	*p-value*	*Adj.* R^2	*p-value*	*Adj.* R^2	*p-value*
Transportation	583	0.76	0.68	<0.01	0.23	<0.01	0.68	<0.01	0.22	<0.01
Utilities	805	0.27	0.18	<0.01	0.09	<0.01	0.16	<0.01	0.03	<0.01
Services	816	0.37	0.32	<0.01	0.09	<0.01	0.31	<0.01	0.08	<0.01
Retail	1,365	0.39	0.29	<0.01	0.13	<0.01	0.25	<0.01	0.06	<0.01
Food	356	0.33	0.26	<0.01	0.26	<0.01	0.14	<0.01	0.00	<0.01
Extractive	62	0.68	0.35	<0.01	0.17	<0.01	0.34	<0.01	0.03	<0.01
Textiles & printing/publishing	932	0.35	0.26	<0.01	0.14	<0.01	0.23	<0.01	0.03	<0.01
Chemicals	446	0.45	0.41	<0.01	0.25	<0.01	0.40	<0.01	0.03	<0.01
Computers	1,113	0.30	0.25	<0.01	0.12	<0.01	0.23	<0.01	0.01	<0.01
Pharmaceuticals	234	0.43	0.42	0.15	0.27	<0.01	0.38	<0.01	0.00	<0.01
Mining & construction	159	0.32	0.27	<0.01	0.06	<0.01	0.23	<0.01	0.04	<0.01
Durable manufacturers	3,057	0.26	0.20	<0.01	0.11	<0.01	0.18	<0.01	0.01	<0.01
Agriculture	47	0.12	0.16	0.65	0.14	0.55	0.01	0.09	0.00	<0.01
Mean	767	0.39	0.31		0.16		0.27		0.04	
Median	583	0.35	0.27		0.14		0.23		0.03	

(Continued on next page)

TABLE 6 (Continued)

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* t-statistic for coefficient estimate or binomial probability for number of coefficients with predicted sign significant at the 0.05 level. Coefficient tests are one-sided (two-sided) for variables with (without) a directional prediction.

† Significantly less than zero at the 0.05 level (two-sided).

See Table 1 for variable definitions.

δ is operating cash cycle, defined in Table 5.

Industry membership is determined by primary SIC code as follows: Agriculture (0100–0999), Mining & construction (1000–1999, excluding 1300–1399), Food (2000–2111), Textiles & printing/publishing (2200–2780), Chemicals (2800–2824, 2840–2899), Pharmaceuticals (2830–2836), Extractive (2900–2999, 1300–1399), Durable manufacturers (3000–3999, excluding 3570–3579 and 3670–3679), Computers (7370–7379, 3570–3579, 3670–3679), Transportation (4000–4899), Utilities (4900–4999), Retail (5000–5999), and Services (7000–8999, excluding 7370–7379).

p-values are associated with F-tests of coefficient restrictions as follows: CF and ACCRUALS ($\phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), EARN only ($\phi_{CF} = \phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), CF only ($\phi_{AR} = \phi_I = -\phi_{AP} = \phi_D = \phi_{AM} = \phi_O = 0$), and Accrual components only ($\phi_{CF} = 0$).

$Z1 = (1/\sqrt{T}) \sum_{j=1}^{T} (t_j \sqrt{k_j/(k_j - 2)})$, where t_j is t-statistic for industry j, k_j is degrees of freedom, and T is the number of industries.

$Z2$ = mean t-statistic/(standard deviation of t-statistics/$\sqrt{(T - 1)}$).

Z1 assumes residual independence; Z2 relaxes this assumption.

ΔAR, ΔINV, ΔAP, DEPR, and AMORT have predicted signs in 13, 13, 10, 13, 12, and 11 of the 13 industries, respectively, a result that has less than a 1 percent probability of being observed by chance, based on a binomial test. The Z1 and Z2 statistics also indicate that the coefficients on cash flow and on each of the six accrual components differ significantly from 0 when the separate industry results are taken together.[22]

Panel C of Table 6 presents statistics associated with tests of coefficient restrictions and reveals that the separate-industry inferences largely are consistent with those drawn from the full sample. Across-industry mean and median adjusted R^2s are highest for the disaggregated earnings specification (0.39 and 0.35), followed by the specification with cash flow and aggregate accruals (0.31 and 0.27), cash flow only (0.27 and 0.23), aggregate earnings only (0.16 and 0.14), and, finally, accrual components only (0.04 and 0.03). These industry averages reflect relations that largely are consistent across industries. In all but the Agriculture and Pharmaceutical industries, the adjusted R^2 is significantly highest for the disaggregated earnings specification. Food and Agriculture are the only industries in which the adjusted R^2 associated with the EARN-only specification is higher than that associated with the CF-only specification.[23]

Homogeneous Model Parameters

We also estimate equation (12) using a sample of firms with relatively homogeneous model parameters. Specifically, we estimate the parameters determining firms' operating cash cycle, i.e., α, β, π, and γ_1, as described in footnote 21, for each firm-year. A firm-year observation is included if the estimate of each parameter lies in the middle two quartiles of that parameter's distribution. This procedure substantially reduces the sample size, reflecting the effects of intersecting the middle two quartiles of the distributions of the four model parameter estimates and the requirement for multiple years of data for firm-specific parameter estimation. Untabulated findings reveal that inferences from this sample are the same as those drawn from Table 3.

Year-by-Year Estimation

The findings thus far are based on pooling observations over time and across firms. This raises the possibility that residual correlation results in overstated test statistics. Thus, as a robustness check, we estimate equation (12) separately by year. The untabulated findings indicate that our inferences are consistent across years, and when based on Z1 and Z2 statistics that aggregate the separate-year findings. In addition, in all ten years the tests of coefficient restrictions indicate that the adjusted R^2s of the disaggregated earnings specification are highest, followed by the specification with cash flow and aggregate accruals, cash flow only, earnings only, and finally, accrual components only.

Predicting Cash Flow More than One Year Ahead

The analyses thus far focus on predicting one-year-ahead cash flow, whereas some related prior research predicts cash flows further in the future. To investigate the predictive abilities of aggregate and disaggregated earnings for cash flows more than one year ahead, we estimate equations (11) and (12) using CF_{t+2}, CF_{t+3}, or CF_{t+4} as the dependent variable. We estimate equation (11) using current and three lags of EARN. We use more than two lags of EARN because our findings in Tables 2 and 3 indicate that more than two lags of EARN are significant in predicting future cash flows; we limit the lags to three for the sake of parsimony. Table 7 presents the findings. Panel A reveals that current and up to three lags of EARN are significant predictors of cash flows more than one year in the future, although as the prediction horizon increases, the prediction equation's explanatory power decreases monotonically.

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[22] $Z1 = (1/\sqrt{T}) \Sigma_{j=1}^{t}(t_j\sqrt{k_j/(k_j - 2)})$, where T is number of industries, j, t_j is the t-statistic, and k_j is the degrees of freedom (Healy et al. 1987). Z2 = mean t-statistic/(standard deviation of t-statistics/$\sqrt{(T - 1)}$) (White 1984; Bernard 1987). Z1 assumes residual independence; Z2 relaxes this assumption.

[23] DKW argues that the predictive ability of earnings relative to cash flow increases as the operating cash cycle increases. Untabulated statistics reveal that the difference in adjusted R^2 between the EARN-only and CF-only specifications is significantly positively correlated with δ (Spearman corr. = 0.55, t = 2.14). However, consistent with δ not fully explaining our findings relating to accrual components, the difference in adjusted R^2 between the unrestricted, i.e., disaggregated earnings, and CF-only specifications is not significantly correlated with δ (Spearman corr. = −0.04, t = −0.12).

Panel B of Table 7 reveals that cash flow and the accrual components of current earnings all have significant predictive ability for cash flow up to four years ahead, and the signs are consistent with those estimated when predicting one-year-ahead cash flow. As with Panel A, the explanatory power of the regression decreases as the prediction horizon increases.[24] Consistent with the one-year-ahead cash flow prediction findings, Panel B reveals that the cash flow and components of accruals specification has the most predictive ability for cash flows up to four years in the future, followed by cash flow and aggregate accruals, cash flow only, and multiple lags of aggregate earnings in Panel A. The current EARN-only and current year accrual components-only specifications have the least predictive ability. All differences are significant.

Prices, Returns, and Discounted Cash Flows as Alternative Dependent Variables

As noted in Section II, prior research concludes that aggregate current earnings has a higher association with prices and returns than does current cash flow. Viewing prices and returns as proxies for future cash flows, these findings conflict with ours. To investigate whether the differences in findings are attributable to variable definitions or sample selection, we estimate equation (12) using as the dependent variable: (1) market value of equity, deflated by average total assets, (2) annual returns, or (3) discounted cash flows, deflated by average total assets.[25]

Table 8 presents the findings. The coefficients have predicted signs and are significantly different from 0, with two exceptions: DEPR's coefficient is significantly negative in the market value and returns specifications, and the coefficient on AMORT is insignificantly different from 0 in the returns specification. Untabulated statistics from estimating the one-year-ahead cash flow and discounted cash flows specifications with cash flow defined as CF minus capital expenditures also reveal significantly negative coefficients on DEPR. These results indicate that the negative DEPR coefficients in the price-based specifications are attributable to market prices implicitly reflecting investing cash flows, whereas CF is operating cash flow. Possible explanations for the insignificant AMORT coefficient in the returns specification are that amortization expense is not informative for returns and that AMORT's year-to-year variation is too small to be detectable.

Nonetheless, consistent with our primary results, for each dependent variable the specification permitting the coefficients on cash flow and the components of accruals to differ has a significantly higher adjusted R^2 than the constrained coefficient specifications. In addition, when CF or the discounted cash flow measure is the dependent variable, cash flow

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[24] Untabulated findings reveal that our inferences are unaffected by including up to four lags of the predictor variables, although some of the coefficients on the additional lagged variables are significantly different from 0.

[25] We discount at a rate of 12 percent realized cash flow, CF, for each of three future years and assume that realized cash flow four years in the future is a perpetuity. The additional data required to calculate discounted cash flow reduce the sample size for the estimation using this variable.

TABLE 7
Summary Statistics from Regressions of Future Cash Flows on Earnings or Current Cash Flow and Components of Accruals Sample of Compustat Firms 1987–1996

Panel A: Regression Summary Statistics, Aggregate Earnings Only

$$CF_{i,t+j} = \phi + \sum_{\tau=0}^{3} \phi_{t-\tau} EARN_{i,t-\tau} + u_{i,t}$$

	CF_{t+2}		CF_{t+3}		CF_{t+4}	
Variable	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Intercept	0.07	66.19	0.07	61.23	0.07	55.20
$EARN_t$	0.28	20.64	0.22	14.07	0.22	12.47
$EARN_{t-1}$	0.09	6.65	0.08	5.16	0.07	3.80
$EARN_{t-2}$	0.05	3.32	0.03	1.72	0.01	0.76
$EARN_{t-3}$	0.06	4.69	0.08	5.68	0.08	5.01
Adj. R^2	0.14		0.10		0.08	
n	7,709		6,565		5,481	

Panel B: Regression Summary Statistics, Cash Flow and Accrual Components

$$CF_{i,t+j} = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{i,t} + u_{i,t}$$

		CF_{t+2}		CF_{t+3}		CF_{t+4}	
Variable	*Prediction*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Intercept	?	0.02	11.24	0.02	12.36	0.02	10.29
CF_t	+	0.52	44.08	0.44	33.34	0.42	28.04
ΔAR_t	+	0.32	17.30	0.23	11.19	0.30	12.48
ΔINV_t	+	0.38	19.54	0.26	12.04	0.22	9.07
ΔAP_t	−	−0.41	−16.42	−0.29	−10.23	−0.33	−10.25
$DEPR_t$	+	0.43	14.22	0.49	14.28	0.57	14.47
$AMORT_t$	+	0.36	7.74	0.18	1.72	0.52	3.54
$OTHER_t$	?	0.17	9.19	0.11	5.40	0.16	7.01
Adj. R^2		0.27		0.22		0.21	
n		7,709		6,565		5,481	

Tests of coefficient restrictions:

	CF_{t+2}		CF_{t+3}		CF_{t+4}	
	Adj. R^2	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*
Unrestricted	0.27		0.22		0.21	
Panel A specification	0.14	<0.01	0.10	<0.01	0.08	<0.01
CF and ACCRUALS	0.22	<0.01	0.18	<0.01	0.15	<0.01
CF only	0.19	<0.01	0.17	<0.01	0.14	<0.01
EARN only	0.13	<0.01	0.08	<0.01	0.07	<0.01
Accrual components only	0.09	<0.01	0.09	<0.01	0.10	<0.01

See Table 1 for variable definitions.

p-values comparing the Panel A specification to the unrestricted specification in Panel B are based on Vuong's (1989) Z-statistic. All other p-values are associated with F-tests of coefficient restrictions as follows: CF and ACCRUALS ($\phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), CF only ($\phi_{AR} = \phi_I = -\phi_{AP} = \phi_D = \phi_{AM} = \phi_O = 0$), EARN only ($\phi_{CF} = \phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), and Accrual components only ($\phi_{CF} = 0$).

TABLE 8

Summary Statistics from Regressions of Alternative Measures of Firms' Future Cash Flows on Current Cash Flow and Components of Accruals Sample of Compustat Firms 1987–1996

$$DEPVAR = \phi + \phi_{CF}CF_{i,t} + \phi_{AR}\Delta AR_{i,t} + \phi_{I}\Delta INV_{i,t} + \phi_{AP}\Delta AP_{i,t} + \phi_{D}DEPR_{i,t} + \phi_{AM}AMORT_{i,t} + \phi_{O}OTHER_{,it} + u_{i,t}$$

		Dependent Variable (DEPVAR)							
		CF_{t+1}		*Discounted Cash Flows$_t$*		*Market Value of Equity$_t$*		*Returns$_t$*	
Variable	*Prediction*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
Intercept	?	0.02	10.93	0.26	12.37	0.67	38.00	−0.15	−24.03
CF_t	+	0.53	58.89	5.65	37.27	5.80	48.17	1.40	33.18
ΔAR_t	+	0.33	22.53	5.67	24.85	6.28	33.74	1.47	26.76
ΔINV_t	+	0.25	16.52	3.81	16.42	6.05	29.83	1.27	23.34
ΔAP_t	−	−0.47	−24.25	−2.98	−9.58	−3.47	−14.52	−0.80	−12.64
$DEPR_t$	+	0.47	18.70	5.23	14.18	−4.74	−15.48	−0.86	−14.73
$AMORT_t$	+	0.19	2.28	2.72	2.44	5.73	5.85	0.07	0.29
$OTHER_t$	?	0.10	7.95	1.97	8.60	1.90	10.88	0.85	17.56
Adj. R^2		0.37		0.30		0.27		0.15	
n		9,088		6,087		9,088		9,088	

Tests of coefficient restrictions:

	CF_{t+1}		*Discounted Cash Flows$_t$*		*Market Value of Equity$_t$*		*Returns$_t$*	
	Adj. R^2	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*	*Adj. R^2*	*p-value*
Unrestricted	0.37		0.30		0.27		0.15	
CF and ACCRUALS	0.30	<0.01	0.20	<0.01	0.21	<0.01	0.12	<0.01
EARN only	0.13	<0.01	0.13	<0.01	0.20	<0.01	0.10	<0.01
CF only	0.28	<0.01	0.17	<0.01	0.09	<0.01	0.03	<0.01
Accrual components only	0.12	<0.01	0.14	<0.01	0.09	<0.01	0.05	<0.01

The dependent variables, DEPVAR, are defined as follows:

Discounted Cash Flows = $\sum_{\tau=1}^{3} \frac{1}{(1+r)^{\tau}} CF_{t+\tau} + \frac{1}{r(1+r)^4} CF_{t+4}$, where $r = 0.12$;

Market Value of Equity = year-end market value of equity; and

Returns = CRSP buy-and-hold stock return (including dividends) minus the CRSP value-weighted index (including dividends).

All other variables are defined in Table 1.

All variables are deflated by the average book value of total assets, except in the returns regressions where all variables are per share, deflated by beginning-of-period price. p-values are associated with F-tests of coefficient restrictions as follows: CF and ACCRUALS ($\phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), EARN only ($\phi_{CF} = \phi_{AR} = \phi_I = -\phi_{AP} = -\phi_D = -\phi_{AM} = \phi_O$), CF only ($\phi_{AR} = \phi_I = -\phi_{AP} = \phi_D = \phi_{AM} = \phi_O = 0$), and Accrual components only ($\phi_{CF} = 0$).

has more predictive ability than aggregate earnings. However, consistent with prior price- and returns-based research, when market value or returns is the dependent variable, aggregate earnings has more predictive ability than cash flow. This difference in findings likely is attributable to the difference in the sign of the DEPR coefficient—DEPR is subtracted to arrive at EARN, not added—rather than to sample selection or variable definitions.

Other Robustness Checks

Four additional sensitivity checks do not affect our inferences: (1) estimating all specifications using undeflated variables, and using sales, number of shares outstanding, and market value of equity as alternative deflators; (2) defining EARN as operating earnings after depreciation, which excludes special items, as in Sloan (1996); (3) limiting the sample to firms disclosing accrual components on the statement of cash flows;[26] and (4) limiting the sample to firms trading on NYSE and AMEX, as in Dechow (1994) and Sloan (1996).

VII. SUMMARY AND CONCLUSIONS

One of the FASB's stated objectives is that earnings and its components, which include accruals, provide a better indication of future cash flows than current cash flow. However, extant research does not clearly establish this fundamental accounting link. Using a model of the accrual process, we provide insights into the role of accruals in predicting future cash flows and provide evidence consistent with predictions based on the model.

Our predictions are based on an extended analysis of the Dechow et al. (1998) model of the working capital accrual process. The model contains several simplifying assumptions; it includes only three current accruals with relatively simple time-series processes. We leave to future research the development of a more comprehensive model, including explicit modeling of long-term accruals. Whereas we limit our predictions to the signs of the weights on all earnings components, a more complete model would permit specific predictions about the magnitudes of the weights. It also would permit specific predictions about the role of long-term term accruals in predicting future cash flows, and about the relation between current earnings and its components and cash flow more than one year ahead. We also leave to future research the modeling of industry-specific differences in accounting policies and practices, which could sharpen predictions and inferences.

Despite these limitations, however, the model provides insights into the role of accruals in predicting future cash flows. In particular, the model reveals that the predictive ability of accruals for future operating cash flows derives from management's expected future investments in operating assets, in addition to delayed cash receipts or payments related to past transactions. Each major accrual reflects different information about future cash flows, resulting in different weights in prediction. In contrast, aggregate earnings implicitly places the same weight on each earnings component, masking information relevant to predicting future cash flows. A key insight from the model is that expected future cash flow can be expressed as a function of several lags of aggregate earnings or as a function of the cash flow and major accrual components of current earnings.

Consistent with predictions, we find that disaggregating earnings into cash flow and six major accrual components—change in accounts receivable, change in inventory, change in accounts payable, depreciation, amortization, and other accruals—significantly enhances the predictive ability of earnings. Each accrual component's relation with future cash flows is significant and of the predicted sign, indicating the accrual components aid in predicting future cash flow beyond current cash flow. In contrast to claims in the financial press, long-term accruals, specifically depreciation of long-lived tangible assets and amortization of intangible assets, have significant predictive ability for future cash flows. We also find that the explanatory power of disaggregated current earnings exceeds that of current and up to six lags of aggregate earnings, and that of current and up to four lags of earnings disaggregated into cash flow and aggregate accruals. Disaggregating cash flow from aggregate accruals significantly increases predictive ability relative to aggregate earnings, but disaggregating accruals into its major components further significantly increases predictive ability. Our findings are robust to predicting cash flows several years in the future and using share prices, returns, or discounted cash flows as a proxy for future cash flows. Our findings also are robust to controlling for operating cash cycles and industry membership, suggesting that knowledge of accounting accruals aids in predicting future cash flows over and above these firm characteristics.

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[26] Pearson (Spearman) correlations between the accrual components disclosed under SFAS No. 95 and those calculated from balance sheet data are 0.75 (0.82), 0.82 (0.86), and 0.75 (0.79) for ΔAR, ΔINV, and ΔAP.

REFERENCES

Aboody D., M. E. Barth, and R. Kasznik. 1999. Revaluations of fixed assets and future firm performance: Evidence from the U.K. *Journal of Accounting and Economics* 26: 149–178.

Ali, A. 1994. The incremental information content of earnings, working capital from operations, and cash flows. *Journal of Accounting Research* 32: 61–74.

Ball, R., and P. Brown. 1968. An empirical evaluation of accounting income numbers. *Journal of Accounting Research* 6: 159–178.

Barth, M. E., W. H. Beaver, and M. A. Wolfson. 1990. Components of earnings and the structure of bank share prices. *Financial Analysts Journal* 46: 53–60.

———, ———, and W. R. Landsman. 1992. The market valuation implications of net periodic pension cost components. *Journal of Accounting and Economics* 15: 27–62.

———, ———, and ———. 1998. Relative valuation roles of equity book value and net income as a function of financial health. *Journal of Accounting and Economics* 25: 1–34.

———, ———, J. R. M. Hand, and W. R. Landsman. 1999. Accruals, cash flows, and equity values. *Review of Accounting Studies* 4: 205–229.

———, ———, ———, and ———. 2000. Accrual components, earnings forecasting, and equity values. Working paper, Stanford University, Graduate School of Business.

———, and A. P. Hutton. 2000. Information intermediaries and the pricing of accruals. Working paper, Stanford University.

Beaver, W. H., and R. E. Dukes. 1972. Interperiod tax allocation, earnings expectations, and the behavior of security prices. *The Accounting Review* 47: 320–333.

Bernard, V. L. 1987. Cross-sectional dependence and problems in inference in market-based accounting research. *Journal of Accounting Research* 25: 1–48.

———, and T. L. Stober. 1989. The nature and amount of information in cash flows and accruals. *The Accounting Review* 64: 624–652.

———, and J. Noel. 1991. Do inventory disclosures predict sales and earnings? *Journal of Accounting, Auditing, and Finance* 6: 145–181.

Bowen, R. M., D. Burgstahler, and L. A. Daley. 1986. Evidence on the relationships between earnings and various measures of cash flow. *The Accounting Review* 61: 713–725.

———, ———, and ———. 1987. The incremental information content of accruals versus cash flows. *The Accounting Review* 62: 723–747.

Burgstahler, D., J. Jiambalvo, and Y. Pyo. 1998. The informativeness of cash flows for future cash flows. Working paper, University of Washington.

Cheng, C., C. Liu, and T. Schaefer. 1996. Earnings permanence and the incremental information content of cash flows from operations. *Journal of Accounting Research* 34: 173–181.

Dechow, P. M. 1994. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics* 18: 3–42.

———, S. P. Kothari, and R. L. Watts. 1998. The relation between earnings and cash flows. *Journal of Accounting and Economics* 25: 133–168.

DeFond, M. L., and C. W. Park. 2000. The reversal of abnormal accruals and the market valuation of earnings surprises. Working paper, University of Southern California.

Feltham, G. A., and J. A. Ohlson. 1996. Uncertainty resolution and the theory of depreciation measurement. *Journal of Accounting Research* 34: 209–234.

Financial Accounting Standards Board (FASB). 1978. *Objectives of Financial Reporting by Business Enterprises*. Statement of Financial Accounting Concepts No. 1. Stamford, CT: FASB.

———. 1987. *Statement of Cash Flows*. Statement of Financial Accounting Standards No. 95. Stamford, CT: FASB.

Finger, C. A. 1994. The ability of earnings to predict future earnings and cash flow. *Journal of Accounting Research* 32: 210–223.

Greenberg, R. R., G. L. Johnson, and K. Ramesh. 1986. Earnings versus cash flow as a predictor of future cash flow measures. *Journal of Accounting, Auditing, and Finance* 1: 266–277.

Healy, P., S. Kang, and K. G. Palepu. 1987. The effect of accounting procedure changes on CEO's cash salary and bonus compensation. *Journal of Accounting and Economics* 9: 7–34.

Lipe, R. 1986. The information contained in the components of earnings. *Journal of Accounting Research* 24: 37–68.

Lorek, K. S., and G. L. Willinger. 1996. A multivariate time-series prediction model for cash-flow data. *The Accounting Review* 71: 81–101.

MacDonald, E. 1999a. Analysts increasingly favor using cash flow over reported earnings in stock valuations. *Wall Street Journal* (April 1): C2.

———. 1999b. First call will add cash EPS estimates for 20 web firms, responding to street. *Wall Street Journal* (April 14): A4.

McNichols, M., and G. P. Wilson 1988. Evidence of earnings management from the provision for bad debts. *Journal of Accounting Research* 26: 1–40.

Penman, S. H., and T. Sougiannis. 1998. A comparison of dividend, cash flow, and earnings approaches to equity valuation. *Contemporary Accounting Research* 15: 343–383.

Pfeiffer, R. J., P. T. Elgers, M. H. Lo, and L. L. Rees. 1998. Additional evidence on the incremental information content of cash flows and accruals: The impact of errors in measuring market expectations. *The Accounting Review* 73: 373–385.

Rayburn, J. 1986. The association of operating cash flow and accruals with security returns. *Journal of Accounting Research* 24: 112–133.

Sloan, R. G. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71: 289–315.

Vuong, Q. H. 1989. Likelihood ratio tests for model selection and non-nested hypotheses. *Econometrica* 57: 307–333.

White, H. 1984. *Asymptotic Theory for Econometricians*. Orlando, FL: Academic Press, Inc., Harcourt Brace Jovanovich.

Wilson, G. P. 1986. The relative information content of accruals and cash flows: Combined evidence at the earnings announcement and annual report release date. *Journal of Accounting Research* 24: 165–200.

———. 1987. The incremental information content of the accrual and funds components of earnings after controlling for earnings. *The Accounting Review* 62: 293–322.

Xie, H. 2000. Are discretionary accruals mispriced? A reexamination. Working paper, The University of Arizona.

THE ACCOUNTING REVIEW
Vo. 76, No. 1
January 2001
pp. 59–80

The Influence of Potentially Fraudulent Reports on Audit Risk Assessment and Planning

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ABSTRACT: We consider how auditors assess the risk of fraudulent financial reporting and plan their audit where a possibly fraudulent auditee anticipates the assessment and planning process. The auditor uses the auditee's (possibly fraudulent) earnings report to revise his beliefs about the likelihood of fraud when formulating an audit plan.

We find that as underlying earnings increase, a fraudulent auditee increases reported earnings. In turn, as the auditee's reported earnings increase, the auditor increases audit effort. We also find that the auditee (who knows the auditor will use the report for audit planning) selects reports that increase his own expected payoff, relative to reports he would select if the auditor did not observe the report before finalizing the audit plan. By contrast, the auditor is no better off using the auditee's report for audit planning. Inherent risk, detection risk, and overall audit risk can increase when the auditor uses the auditee's report. Thus, because of the dynamic interaction between the auditor and auditee, procedures that aid in assessing audit risk may not reduce that risk or result in more efficient audits.

Key Words: *Fraud risk assessment, Strategic auditing, Audit risk, Audit planning.*

Helpful comments were provided by Steve Matsunaga, Birendra Mishra, two anonymous reviewers, and Raffi Indjejikian (Associate Editor).

Submitted July 1999
Accepted June 2000

I. INTRODUCTION

Fraudulent financial reporting continues to concern the auditing profession, as illustrated by the issuance of Statement on Auditing Standards No. 82, AICPA (1997a), *Consideration of Fraud in a Financial Statement Audit* (hereafter SAS No. 82; see also KPMG 1999). SAS No. 82 requires the auditor to consider various fraud risk factors, to assess the risk of misstatements from fraudulent financial reporting and to use this assessment in audit planning. This paper considers the auditor's use of an auditee's earnings report for fraud risk assessment and audit planning when a possibly fraudulent auditee anticipates that the auditor will use the auditee's report in this manner. That is, we investigate the interactive nature of the auditee's reporting strategy and the auditor's audit plan. We also consider how basing the audit plan on the auditee's earnings report affects inherent risk, detection risk, and overall audit risk.

SAS No. 82 suggests various fraud risk factors that the auditor should consider in assessing the risk of fraud. The reasonableness of management's report in light of known industry conditions and management characteristics (such as compensation arrangements that may affect management's propensity to overstate earnings) is an important fraud risk factor. For example, if management reports unexpectedly high earnings given industry conditions and historical trends, then the auditor may be more suspicious that the report is fraudulent (see SAS No. 82, ¶ 16 and ¶ 17).

We consider how an auditor uses management's earnings report to update his beliefs about the likelihood of fraud and then chooses audit effort. The key features of our model are that management's report is endogenous and that the auditor is uncertain about management's incentives to issue a fraudulent report. The auditor's inferences from the report depend on the manager's (the auditee's) choice of reporting strategy, which in turn depends on how the manager believes the auditor will respond to the report. Resolving this problem requires a complete analysis of the interaction between auditor and auditee—that is, a game-theoretic approach.

To illustrate how management reports affect fraud risk assessment, we first derive the auditee's reporting strategy and auditor's effort level for a benchmark setting in which the auditor does not observe the auditee's report before developing an audit plan. We compare this benchmark to a setting in which the auditor does observe the auditee's report before developing an audit plan. A fraudulent auditee can use his report to manipulate the auditor's inferences to the auditee's benefit. Indeed, relative to the benchmark setting, the extent of auditing depends on the auditee's report only because the auditor can update his beliefs about whether the auditee is fraudulent. The fraudulent auditee can exploit his informational advantage (i.e., knowing the underlying earnings amount and whether he is fraudulent) by issuing a report such that the amount of the fraud and the risk of detection combine to increase his expected payoff relative to the benchmark setting. By contrast, the auditor is no better off from using the auditee's report in planning the audit. In fact, the reduction in audit effort can increase inherent risk, detection risk, and overall audit risk with no change in the auditor's expected payoff.

Our analysis yields three primary inferences. First, in contrast to earlier models, we formulate a setting in which the auditor's prior beliefs about earnings play an explicit and empirically plausible role in equilibrium strategies. This formulation provides a first step toward developing predictions about the interactions among the auditor's beliefs about fraudulent misstatements, management's earnings reports, and report-contingent audit plans. Second, report-contingent audit plans (as compared to audit plans formulated without management reports) have no effect on overall expected audit costs when these costs include both expected undetected fraud and the direct costs of audit effort. However, report-contingent audit plans do permit the auditee to use his informational advantage to select a report that increases his expected payoff relative to a setting without report-contingent plans. Finally, when earnings are exponentially distributed, report-contingent audit planning results in higher detection risk, inherent risk, and overall audit risk.[1] When earnings are exponentially distributed, the auditor's posterior fraud probability (i.e., his fraud probability conditional on the report) is constant and always greater than his prior probability (i.e., his fraud probability with no report) unless the report is so low that it must be honest. In response to this increased inherent risk assessment (fraud probability) and the auditor's incentive structure, the fraudulent auditee reduces the amount of fraud and overstates by a constant amount. Similarly, in response to the auditee's incentive structure and reduced fraud, the auditor expends less audit effort, resulting in increased detection risk. Because control risk is unaffected, overall audit risk increases due to the increase in both detection and inherent risks when report-contingent audit planning is implemented.

While a number of papers have addressed strategic issues in auditing, few consider meaningful settings of report-contingent audit planning. Two studies, Newman et al. (1996) and Chatterjee and Morton (1998), allow endogenous reporting in a fraud setting, and thereby provide insights into the auditor's use of management's reports in audit planning.[2] In contrast to our setting, these studies assume that the auditor knows with certainty that the auditee is fraudulent. While the equilibrium strategies in these studies share some commonalities with ours, neither the audit strategy nor the reporting strategy depends on the characteristics of the underlying earnings distribution. The strategies in these papers are independent of the earnings distribution because the auditor knows that fraud is being committed and does not use the report to update his prior beliefs about the likelihood of fraud. As a result, these analyses cannot examine how report-contingent auditing affects the auditor's fraud risk assessment before he finalizes his audit plans.

Our model is developed in Section II. Section III characterizes equilibrium strategies and how those strategies are influenced by model parameters for the special case in which earnings are exponentially distributed. We consider audit risk issues in Section IV. Section V investigates the implications of alternative earnings distribution assumptions. Section VI presents our conclusions.

II. MODEL DEVELOPMENT

When formulating an audit plan, the auditor is unsure of management's incentive and capability to report fraudulent financial information. SAS No. 82 emphasizes the auditor's responsibility for explicitly considering management's characteristics and motivations (SAS No. 82, ¶ 16–17). While the auditee knows his predilection for fraud, the auditor, regardless of evidence observed, remains uncertain about whether the auditee will engage in fraud.

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[1] More generally, when report-contingent audit planning occurs, detection risk increases for any earnings-distribution assumption. However, Section V shows that inherent risk, overall audit risk, and the amount of fraud may increase or decrease for some earnings reports, depending on the underlying earnings distribution.

[2] Morton (1993) also allows endogenous reporting in a fraud setting. However, Morton (1993) assumes that the auditor can commit to a strategy before observing the auditee's report. The resulting equilibrium, in which the auditor only audits truthful reports and never discovers fraud, does not seem to be a reasonable characterization of real external audits. Other financial and tax audit models with a strategic element include Caplan (1999), Noel and Patterson (2000), Bloomfield (1995), Sansing (1993), Matsumura and Tucker (1992), Shibano (1990), and Newman and Noel (1989). Newman et al. (1996) develop a taxonomy of strategic-auditing papers.

Our model reflects this uncertainty by assuming two possible types of auditees, fraudulent and honest, occurring with probability P(F) and 1 − P(F), respectively.[3]

We assume that the fraudulent type wishes to overstate earnings.[4] We assume an "inherently" honest type merely for analytical convenience. The key feature is that the auditor is uncertain about some component of the auditee's incentive structure or preferences, and the auditor cannot obtain perfect information about that component.[5] The extreme assumption of an honest-auditee type is convenient because it permits us to solve for only one fraudulent-auditee reporting strategy. The critical point, however, is that multiple auditee-incentive-types exist, and the auditor's uncertainty over those types cannot be eliminated based on the evidence he observes.

We assume that P(F) represents the auditor's beliefs after he evaluates all *independent* information about the auditee, but before he observes the auditee's earnings report. That is, P(F) represents the auditor's belief that the auditee is fraudulent after considering the auditee's observable incentive structure, past history, disputes with prior auditors, and so forth, but before observing this period's reported earnings.

Earnings, denoted by $\tilde{y}$, are distributed according to the probability density function f(y) with support $[y_{LB}, \infty)$, where f(y) is positive and continuous. We assume that $y_{LB} = 0$ to simplify notation.[6] These earnings beliefs are based on the auditor's general knowledge of the auditee's industry, the auditee's specific circumstances, and any other information that management does not influence.

The auditee observes the realized y prior to selecting a report, so that an infinite number of auditee earnings-types exist, one for each possible value of $\tilde{y}$. After observing y, the auditee selects an earnings report, denoted z, where the honest auditee always selects $z = y$ and the fraudulent auditee selects $z \geq y$.[7]

After observing the auditee's report, the auditor formulates the audit plan—the extent and mix of audit procedures (substantive tests) to provide sufficient evidence of the likelihood and extent of misstatement. We simplify this process by assuming that the auditor, after observing the report, selects the extent of effort to apply, where audit effort maps directly into the probability of fraud detection. Audit effort is denoted by x, which is scaled to represent the probability of overstatement detection. The marginal cost of audit effort is denoted by c, implying that total audit cost is cx.

Benchmark Case: No Observable Earnings Report

To illustrate the strategic effects of an observable auditee report, we first consider a benchmark setting in which the auditor *cannot* observe the auditee's earnings report before selecting audit effort. In other words, the auditor uses only his prior beliefs about earnings and auditee incentive-types in determining x. This benchmark case allows us to investigate how the opportunity to observe the auditee's report alters strategies and audit risk.

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[3] For all uncertainty in our model, we assume that both auditor and auditee share beliefs about the distributions (e.g., P(F) and 1 − P(F)). Further, we assume common knowledge of beliefs and payoffs. Other papers that assume multiple incentive-types in audit settings include Bloomfield (1995), Caplan (1999), Rhoades (1999), Smith et al. (2000), and Erard and Feinstein (1994).

[4] *Considering Fraud in a Financial Statement Audit: Practical Guidance for Applying SAS No. 82*, AICPA (1997c) details the types of fraud the auditor might expect to find, almost all of which involve the overstatement of earnings.

[5] For example, SAS No. 82, ¶ 9, emphasizes that the auditor cannot be certain of fraud regardless of unusual or implicating signals observed, because these signals may result from false allegations or unusual economic circumstances.

[6] We could easily relax the assumption that earnings have a lower bound of 0 at the expense of more complex notation.

[7] We consider equilibria in which the auditee selects only one report value for any realized earnings level; that is, no randomization occurs.

We assume both the auditor and auditee are risk neutral and state the auditor's payoff function in terms of costs, implicitly assuming that the audit fee is negotiated in advance and held constant. Thus, the auditor's expected cost function in the benchmark case is:

$$A(x) = (1 - x)\{(1 - P(F))E[\tilde{y} - \tilde{y}] + P(F)E[\tilde{z} - \tilde{y}]\} + cx,$$

or

$$A(x) = (1 - x)P(F)E[\tilde{z} - \tilde{y}] + cx. \qquad (1)$$

The auditor's cost function consists of two components, the extent of expected overstatement when no detection occurs, $(1 - x)P(F)E[\tilde{z} - \tilde{y}]$, and the direct cost of the audit, cx. The expectation operator in equation (1) is applied over all random variables. The auditor's payoff reflects the expected total costs of auditing and undetected overstatement. The auditor minimizes total expected costs through the selection of x.

The fraudulent auditee's expected payoff function is:

$$M(z) = (1 - x)(z - y) - x(z - y)p, \qquad (2)$$

where $p > 0$. Because we are interested only in overstatement, we assume that the auditee receives no benefit from understatement, regardless of the auditor's action. Thus, we have $z \geq y$ for all y. The fraudulent auditee's payoff function is composed of the expected amount of undetected overstatement, $(1 - x)(z - y)$, and an expected penalty for detected overstatement, $x(z - y)p$, which increases linearly with the amount of overstatement. The multiplier p simply weights the marginal penalty for detection relative to the marginal benefits of overstatement. The fraudulent auditee's payoff function captures the tension between preferred overstatement when undetected and preferred honesty when detected. The fraudulent auditee selects z to maximize M(z), and the honest auditee always reports truthfully.

Proposition 1: Equilibrium strategies in the benchmark scenario consist of:

1) a fraudulent auditee reporting strategy: $z = y + (c/P(F))$ for all y,[8] and
2) the audit strategy: $x = 1/(1 + p)$.

(All proofs appear in the Appendix.)

Proposition 1 implies that in this benchmark case the fraudulent auditee's overstatement, $z - y$, increases with audit costs, decreases with the probability of a fraudulent auditee, and is unaffected by the observed value of earnings. However, the auditee's reporting strategy does not depend on the auditee's penalty for detected overstatement.

Proposition 1 also implies that audit effort, x, decreases as the auditee's overstatement penalty multiplier, p, increases, converges to 0 as p goes to infinity, and converges to 1 (the maximum audit effort) as p approaches 0. Neither audit cost nor the probability of a fraudulent auditee affects the audit strategy.

As with many simultaneous games, each player's strategy is determined largely by the other player's payoff determinants. The auditor's strategy renders the fraudulent auditee indifferent at the margin to additional overstatement. Similarly, the fraudulent auditee's strategy ensures that the auditor is indifferent to increasing or decreasing effort.

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[8] More generally, the fraudulent-auditee's strategy must satisfy $E(\tilde{z}) = E((\tilde{y}) + (c/P(F))$. Thus, other possible equilibrium-reporting strategies may exist that involve randomization, but they are payoff-equivalent and therefore a matter of indifference to the auditee and auditor.

Observable Earnings Report Case

In this case, the auditor observes the auditee's earnings report and assesses the likelihood that the auditee is fraudulent. Conversely, the fraudulent auditee considers the auditor's reaction when deciding upon a report. The important feature of the problem considered in this section is that each party chooses his strategy with the understanding that the auditor determines the audit plan or audit effort after observing reported earnings.

When the auditor observes the earnings report before performing substantive tests, his expected cost is given by:

$$A(x) = (1 - x)P(F|z)(z - y[z]) + cx. \tag{3}$$

The change in the auditor's payoff formulation reflects the fact that the auditor observes the auditee's report, z, before selecting the level of audit effort, x. Thus, the auditor conditions his assessed risk of fraud, P(F|z), on the observed value of z. The auditor's independent information about $\tilde{y}$ combined with management's representation, z, conveys information to the auditor about the auditee's incentive-type.

Because the auditor's selection of x now depends on z, the fraudulent auditee's payoff function must also reflect this dependency, denoted x[z] in the following:

$$M(z) = (1 - x[z])(z - y) - x[z](z - y)p. \tag{4}$$

Of course, the honest auditee continues to report z = y.

In contrast to the simultaneous game in the benchmark case, this setting is sequential. The auditee first selects a report that the auditor observes before choosing audit effort. The appropriate equilibrium concept is a Bayesian Nash Equilibrium (see Fudenberg and Tirole [1992] for a discussion), in which each player selects a best response to the other player's strategy and the auditor's beliefs are revised according to Bayes' rule.[9]

The auditor's first-order condition is given by:

$$P(F|z)(z - y[z]) - c = 0 \tag{5}$$

for all z.

The auditor's posterior beliefs are given by Bayes' rule (the Appendix derives equation [6]):

$$P(F|z) = \frac{P(F)f(y[z])|y'[z]|}{(1 - P(F))f(z) + P(F)f(y[z])|y'[z]|}. \tag{6}$$

Here, y[z] represents the inferred value of y when the report is made by a fraudulent auditee, and z represents the inferred value of y when the report is made by an honest auditee. These values are appropriately weighted by the probability of auditee-type (P(F) and 1

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[9] Each possible value of z in [0,∞) can be observed as an equilibrium response due to the existence of an honest auditee type (i.e., there are no out-of-equilibrium reports). Therefore, the auditor can always apply Bayes' rule to revise beliefs.

$-$ P(F)) and the conditional densities over earnings for the honest and fraudulent types (f(z) and f(y[z])|y′[z]|).

Using equations (5) and (6), the auditor's first-order condition can be expressed as a first-order differential equation:

$$z - c = \frac{(1 - P(F))zf(z) + P(F)y[z]f(y[z])|y'[z]|}{(1 - P(F))f(z) + P(F)f(y[z])|y'[z]|}. \tag{7}$$

Alternatively, we have:

$$\frac{(P(F)}{1 - P(F)}(z - y[z] - c)\frac{f(y[z])}{f(z)}|y'[z]| = c. \tag{8}$$

The fraudulent auditee's first-order condition is given by the first-order differential equation:

$$x'[z](z - y)(1 + p) + x[z](1 + p) - 1 = 0 \tag{9}$$

for all y.

In principle, we can determine equilibrium reporting and auditing strategies by solving equation (8) for y[z] (or, more intuitively, z[y], the auditee's reporting strategy) and substituting the solution into equation (9) to determine x[z]. In addition, two boundary conditions (one for each differential equation) must be satisfied to obtain the solutions to x[z] and y[z]. One boundary condition requires that $x[z_{LB}] = 0$. That is, for some sufficiently low reported value of z, the lower bound of z or z_{LB}, the auditor does not audit. For all earnings reports below z_{LB}, no audit occurs: $x[z \leq z_{LB}] = 0$. Concurrently, the fraudulent auditee never reports $z < z_{LB}$, which is consistent with the second boundary condition, $y[z_{LB}] = 0$.

We first demonstrate several results that hold for any earnings distribution. Lemma 1 describes generic characteristics of the audit strategy and the reporting strategy.

Lemma 1: If the auditor observes the earnings report before formulating the audit plan, then:

1) audit effort increases as the report increases ($x'[z] > 0$) for $z \geq z_{LB}$; and

2) the fraudulent auditee's report increases as underlying earnings increase ($z'[y] > 0$).

Lemma 1 reinforces the plausibility of our basic model. Relatively higher earnings reports result in greater audit effort, and relatively higher underlying earnings result in higher reported earnings. The latter result ($z'[y] > 0$, which implies $y'[z] > 0$) allows us to eliminate the absolute value sign in equation (8) in subsequent analysis.

Next, we consider the welfare effects of report-contingent audit plans. If the report is informative about the likelihood that the auditee is fraudulent, the auditor considers the report in formulating an audit plan (as indicated by Lemma 1). But, the auditee may be able to exploit his informational advantage. Proposition 2 indicates that the auditee's expected payoff always increases from report-contingent plans, while the auditor is unaffected.

Proposition 2: Relative to the setting in which the auditor does not observe earnings before developing the audit plan, report-contingent audit plans:

1) do not change the auditor's expected cost; and
2) increase the fraudulent auditee's expected payoff.

In both settings, the auditor's first-order condition implies that the auditor's expected cost is c. If the auditor does not observe the auditee's report, then the auditee's expected payoff is 0 because the auditor's strategy makes the auditee indifferent between committing fraud and not committing fraud. On the other hand, if the auditor does observe the auditee's report, then the auditee obtains a strictly positive payoff. The auditee chooses a report strategically in order to affect the auditor's choice of x[z] and consequently is able to increase his own payoff for each value of z.

In Proposition 3, we consider a setting in which there are no honest auditee-types to emphasize the central importance of multiple incentive-types to our analysis.

Proposition 3: Suppose that the auditor observes the earnings report before formulating the audit plan and that there are no honest auditees ($P(F) = 1$). Then equilibrium strategies consist of:

1) a fraudulent auditee reporting strategy: $z = y + c$ for all y; and
2) the audit strategy: $x[z] = (1 - e^{-(z-c)/c})/(1 + p)$.

Despite the auditor's ability to perfectly infer true earnings from the report, he must perform substantive procedures to maintain the equilibrium. The auditor cannot claim that an overstatement or fraud exists without supporting evidence. If the auditee believed no evidence of fraud would ever be collected, he would choose a larger amount of fraud.[10]

Proposition 3 reveals the significance of multiple auditee-incentive-types to the issues addressed in this paper. The auditor's ability to infer underlying earnings precisely for a known fraudulent auditee makes the prior distribution over earnings irrelevant.

The solution to equation (8) that yields z[y] (or y[z]) depends on the ratio $LR(z) = f(z)/(f(y[z])y'[z])$. Rearranging equation (8) we obtain:

$$y[z] = z - c - c\left(\frac{1 - P(F)}{P(F)}\right) LR\,(z). \tag{8'}$$

Using LR(z), the auditor infers (from the report z) the likelihood that the auditee is the nonfraudulent type. The ratio $(1 - P(F))/P(F)$ is the prior likelihood that the auditee is the nonfraudulent type. If the auditor knows with certainty that the auditee is the fraudulent type, then $1 - P(F) = 0$ and $y[z] = z - c$. If the report z provides no additional information about the likelihood of the nonfraudulent type, then $LR(z) = 1$ and y[z] is the same as in the benchmark case. The amount of overstatement decreases as z becomes more diagnostic of fraud (as LR(z) decreases).

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[10] The argument that the auditor's task is to collect confirming evidence of fraud, even when the auditee's strategy is perfectly predictable, is also used in Newman et al. (1996) and Chatterjee and Morton (1998).

III. EQUILIBRIUM STRATEGIES WHEN EARNINGS ARE EXPONENTIALLY DISTRIBUTED

In general, the differential equations (8) and (9) cannot be solved in closed form, and we must rely on numerical solutions. However, for the special case in which $\tilde{y}$ is exponentially distributed, we can obtain explicit representations of the solutions. To illustrate the effects of various model parameters, this section and Section IV use this distributional assumption. We explore the effects of alternative earnings distribution assumptions in Section V.

Assume that earnings, $\tilde{y}$, are exponentially distributed with parameter α: $f(y) = \alpha e^{-\alpha y}$. Thus, the mean of the earnings distribution is $1/\alpha$ and the variance is $1/\alpha^2$. In addition, low earnings amounts are relatively more probable than high earnings. This distributional assumption allows us to simplify $f(y[z])/f(z)$ in equation (8) to obtain:

$$\frac{f(y[z])}{f(z)} = e^{\alpha(z-y[z])}. \tag{10}$$

Proposition 4 describes the equilibrium that results from this distributional assumption.

Proposition 4: If earnings are exponentially distributed with parameter α, equilibrium strategies are:

1) the fraudulent auditee reporting strategy: $z[y] = y + z_{LB}$ for all y; and

2) the audit strategy: $x[z] = \dfrac{1 - e^{-\frac{(z-z_{LB})}{z_{LB}}}}{1 + p}$ for $z > z_{LB}$ and

$x[z] = 0$ for $z \leq z_{LB}$

where z_{LB} satisfies:

$$\frac{P(F)}{1 - P(F)}(z_{LB} - c)e^{\alpha z_{LB}} = c.^{11} \tag{11}$$

From Proposition 4 we gain intuition about how the auditor and auditee behave. The fraudulent auditee's reporting strategy is a simple linear function of observed earnings. Audit effort (x[z]) increases as the auditee's report increases and converges to $1/(1 + p)$ (the audit strategy in the benchmark setting) as the reported earnings become large.

Next, we analyze how various model assumptions affect strategic behavior. First, we compare strategic behavior in Proposition 4 to our benchmark case; then, we discuss how exogenous parameters affect strategic behavior.

The Effects of an Observable Earnings Report on Strategies

In Proposition 5, we determine the effects of an observable earnings report on strategies by comparing the strategies derived in Propositions 1 and 4.

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[11] A solution to equation (11) exists but cannot be characterized as a common closed-form function.

Proposition 5: Assume earnings are exponentially distributed with parameter α. Then, relative to the benchmark setting, an observable report:

1) decreases audit effort; and
2) decreases the extent of overreporting.

Observing the auditee's report allows the auditor to tailor the level of audit effort to the report. As Proposition 5 indicates, the result is a decrease in audit effort; at the same time, the extent of overreporting decreases. As we know from Proposition 2, the welfare effects of these strategy changes are to leave the auditor's payoff unchanged but to increase the auditee's expected payoff. When the report is observable, the auditee reduces the amount of misstatement but is better off than in the benchmark case because the auditor concurrently reduces the likelihood of detection. If the auditee maintained his benchmark strategy, the auditor would set $x = 1$, leaving the auditee worse off than in the benchmark case. Of course, this strategy combination is not an equilibrium because then the auditee's best response would be to act honestly, and so on. Thus, if the auditee makes an informative report that reduces the extent of fraud, he must be made no worse off by that report.

The Effects of Parameters on Strategies when the Auditor Observes Earnings

Consider the setting in which the auditor observes the earnings report when the underlying earnings are distributed exponentially. Table 1 details the effects of changes in the game's parameters, c, p, P(F) and α, on the auditor's and auditee's equilibrium strategies, x[z] and z[y].[12] For the most part, the conclusions in Table 1 are intuitively appealing. Fraudulent auditee overstatement increases as the cost of auditing increases and as the likelihood that the auditee is honest increases. Both of these changes reduce the extent of auditing, leading a fraudulent auditee to more overstatement. Similarly, an increase in the mean and variance of underlying earnings leads to less auditing and a concomitant increase

TABLE 1

Changes in the Equilibrium Amount of Overstatement and Extent of Auditing Resulting from Changes in the Exogenous Parameters[a]

($\tilde{y}$ is Exponentially Distributed with Parameter α)

	Increase in:				
	Audit Cost *c*	*Auditee Penalty* *p*	*Probability of Dishonest Auditee* *P(F)*	*Reported Value of Earnings* *z*	*Mean and Variance of* $\tilde{y}$ $1/\alpha$ *and* $1/\alpha^2$
Effect on:					
The Amount of Overstatement, z_{lb}, and Reported Value, z[y]	+	0	−	NA	+
Audit Effort, x[z]	−	−	+	+	−

[a] These comparative statics allow all optimal reactions to occur for changes in each individual parameter while holding all other parameters constant.

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[12] Derivations of Table 1 results are available from the authors upon request.

in overstatement. Perhaps the only counterintuitive result is that changing the penalty for fraud does not influence the auditee's reporting strategy, which is consistent with the benchmark case. This result is due to the central influence of the auditor's payoff on the auditee's strategy.

IV. AUDIT RISK EFFECTS

Most traditional discussions of audit planning focus on audit risk (e.g., see *Codification of Statements on Auditing Standards [Including Statements on Standards for Attestation Engagements], Numbers 1 to 82,* AICPA 1997b, AU §312 and AU §350). SAS No. 82, ¶ 11–25, considers audit risk in a potential fraud setting. Such discussions tend to view audit risk as an input to the audit-planning process and to suppress consideration of audit losses or costs. In contrast, audit risk in our model is an outcome of the interaction between the auditor and auditee. In light of audit risk models' heavy influence on the professional literature, this section explores how conditioning substantive tests on the auditee's earnings report affects the components of audit risk.

In the professional audit literature, overall audit risk is the product of three types of risk—inherent risk (IR), detection risk (DR), and control risk (CR) (see, for example, AICPA 1997b, AU §312.20). Inherent risk is the auditor's assessed probability that a material misstatement exists assuming no controls. In our setting, inherent risk is equivalent to the auditor's belief that the report is fraudulent. In our benchmark model, in which the auditor does not observe reported earnings before developing the audit plan, the auditor's assessment of inherent risk is simply P(F), the probability that the auditee is a fraudulent type. When the auditor does observe reported earnings, the auditor's assessment of inherent risk, after observing z, is given by Bayes' Rule:

$$\mathrm{IR} = \mathrm{P}(\mathrm{F}|\mathrm{z}) = \frac{\mathrm{P}(\mathrm{F})\mathrm{f}(\mathrm{y}[\mathrm{z}])\mathrm{y}'[\mathrm{z}]}{(1 - \mathrm{P}(\mathrm{F}))\mathrm{f}(\mathrm{z}) + \mathrm{P}(\mathrm{F})\mathrm{f}(\mathrm{y}[\mathrm{z}])\mathrm{y}'[\mathrm{z}]}, \tag{12}$$

the auditor's posterior belief that the auditee is fraudulent and that, therefore, an overstatement exists. When $\tilde{y}$ is exponentially distributed, this posterior belief simplifies to:

$$\mathrm{IR} = \frac{\mathrm{P}(\mathrm{F})e^{-\alpha(z-z_{LB})}}{(1 - \mathrm{P}(\mathrm{F}))e^{-\alpha z} + \mathrm{P}(\mathrm{F})e^{-\alpha(z-z_{LB})}}. \tag{13}$$

Detection risk is the probability that substantive tests fail to detect an existing material misstatement. In our model, detection risk is given by DR = 1 − x, where x may (when the auditor observes reported earnings) or may not (in the benchmark setting when the auditor does not observe reported earnings) depend on z. In the benchmark case, we showed in Proposition 1 that DR = p/(1 + p). In the case of exponentially distributed $\tilde{y}$, we know from Proposition 4 that when the auditor observes reported earnings, detection risk is given by:

$$\mathrm{DR} = \frac{e^{-\frac{(z-z_{LB})}{z_{LB}}} + p}{1 + p}. \tag{14}$$

Control risk is the probability that internal controls do not prevent or detect an error when the error exists. Our model assumes control risk is equal to 1, consistent with the notion that controls are unlikely to be effective at the level of management fraud considered here (see AICPA 1997b, AU §312.30 [as amended by SAS No. 82]).

Thus, overall audit risk in our setting is equal to:

$$\mathrm{AR} = \mathrm{IR} \times \mathrm{DR}.$$

For the benchmark case:

$$\mathrm{AR} = \mathrm{P(F)}\left(\frac{p}{1+p}\right). \tag{15}$$

For the setting in which the earnings report is observed and earnings are distributed exponentially:

$$\mathrm{AR} = \left(\frac{\mathrm{P(F)}e^{-\alpha(z-z_{LB})}}{(1-\mathrm{P(F)})e^{-\alpha z} + \mathrm{P(F)}e^{-\alpha(z-z_{LB})}}\right)\left(\frac{e^{-\frac{(z-z_{LB})}{z_{LB}}} + p}{1+p}\right). \tag{16}$$

In this section, we consider two issues. First, we consider whether increasing the amount of information available to the auditor in the form of the auditee's report reduces audit risk. Second, we investigate how parameter values affect risk measures when the auditor observes reported earnings. All of the following results are for the case of exponentially distributed earnings.

Proposition 6 compares risk measures when the auditor does and does not observe reported earnings.

Proposition 6: Assume earnings are exponentially distributed with parameter α. Then, relative to the benchmark setting, an observable report:

1) increases inherent risk;
2) increases detection risk; and
3) increases audit risk.

Thus, auditors' use of unaudited earnings information to plan substantive audit procedures *increases*, rather than decreases, audit risk in our setting. The distinguishing characteristic of this setting is the fraudulent auditee's ability to anticipate and exploit the auditor's response to this earnings report. The auditee in our model is informationally advantaged and uses that advantage through his reporting strategy.[13] Detection and audit risk increase because the auditee reduces the amount of fraud and the auditor redistributes his costs, shifting them away from audit effort to the expected costs from undiscovered fraud.

Next, we investigate how parameter changes affect various types of risk. Assume that earnings are exponentially distributed with parameter α and that the auditor observes the

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[13] For other distributions of $\tilde{y}$, inherent risk and/or audit risk may decrease for small values of $\tilde{y}$, but eventually increase relative to the benchmark setting for large values of $\tilde{y}$. In this case, low values of $\tilde{y}$ are associated with overstatement errors that exceed the benchmark case, which is consistent with a lower assessment of inherent risk. See Section V for discussion.

TABLE 2
Changes in Inherent, Detection, and Audit Risk Resulting from Changes in the Exogenous Parameters[a]
($\tilde{y}$ is Exponentially Distributed with Parameter α)

	Increase in:				
	Audit Cost c	*Auditee Penalty* p	*Probability of Dishonest Auditee* $P(F)$	*Realized Value of Earnings* y	*Mean and Variance of* $\tilde{y}$ $1/\alpha$ *and* $1/\alpha^2$
Effect on:					
Inherent Risk (IR)	+	0	+	0	–
Detection Risk (DR)	+	+	–	–	+
Audit Risk (AR)	+	+	+/–	–	+/–

[a] These comparative statics allow all optimal reactions to occur for changes in each individual parameter while holding all other parameters constant.

auditee's report. Table 2 reports the effects of changes in parameters c, p, P(F), realized y, and α, on inherent risk, detection risk, and audit risk.

Some parameter changes have intuitive effects on audit risk. For example, an increase in audit cost increases inherent risk, detection risk, and audit risk. Similarly, an increase in the prior probability of a fraudulent auditee increases inherent risk (the posterior probability of fraud). However, we also learn that in a strategic setting, some components of audit risk do not react to parameter changes as might be expected. For example, detection risk *increases* as the penalty for fraud increases. In a strategic setting, the auditor's strategy must equate the auditee's expected benefit to his expected penalty from undetected fraud if the fraud is detected; therefore, the auditor's strategy depends on the magnitude of this penalty. As the penalty increases, the auditor requires less effort to equate expected benefits and expected penalty. On the other hand, the auditee's strategy must make the auditor's marginal choice of effort, x, optimizing, and is therefore not affected by penalty changes.

V. AN ALTERNATIVE EARNINGS DISTRIBUTION

In this section we explore how an alternative earnings distribution affects the results in Sections III and IV. We now assume that $\tilde{y}$ has a gamma distribution with $\tilde{y} \geq 0$, parameters $r > 1$ and α, and density:

$$f(y) = \frac{e^{-\alpha y} y^{r-1} \alpha^{r}}{\Gamma[r]},$$

where $\Gamma[r] = \int_0^\infty y^{r-1} e^{-y}\, dy$, defined for $r > 0$ (note that when $r = 1$, this is the exponential distribution). We investigate the gamma distribution because many distributions such as Chi-square, Weibull, and Beta are derived from the gamma and because it is skewed to the right. In discussing the applicability of distributions such as the gamma, Casella and Berger (1990, 111) point out that "incomes are necessarily skewed to the right."

To explore the nature of the equilibrium solution, (z[y], x[z]), when $\tilde{y}$ is distributed as a gamma with $r > 1$, we use four example distributions with $\alpha = 0.001$ and $r = 1$ (exponential), 2, 3, and 4. Our analysis for the gamma distribution is similar to that in Sections

III and IV except that the auditee's reporting function, z[y], and the auditor's effort, x[z], lack explicit solutions. We use numerical analysis to determine the nature of z[y] and x[z].[14]

Our analysis shows that the auditor's and auditee's strategies are quite similar to those derived using the exponential distribution; z[y] increases in y and x[z] increases in z (see Figures 1 and 2). However the auditee's reporting function is not linear, which results in risk characteristics and overstatement amounts that are different than those derived from the exponential distribution.

The gamma distribution with $r > 1$ affects our previous conclusion that the overstatement amount decreases when the auditor observes reported earnings. In the exponential case, $LR(z) < 1$, which reduces the overstatement amount relative to the benchmark case. However, for the gamma with $r > 1$, LR(z) can also be greater than 1; thus, for some y, the overstatement amount may *increase*. For example, in Figure 1 when $r = 4$, overstatement for low earnings (low y's) exceeds the benchmark overstatement amount of 500. Yet, as in the case of exponentially distributed earnings, audit effort decreases for all values of r relative to the benchmark case as illustrated in Figure 2. When the auditor observes the earnings report, audit effort decreases regardless of whether the overstatement amount decreases compared to the overstatement amount in the benchmark case. The overstatement amount is more closely tied to inherent risk than to audit effort. Inherent risk is associated

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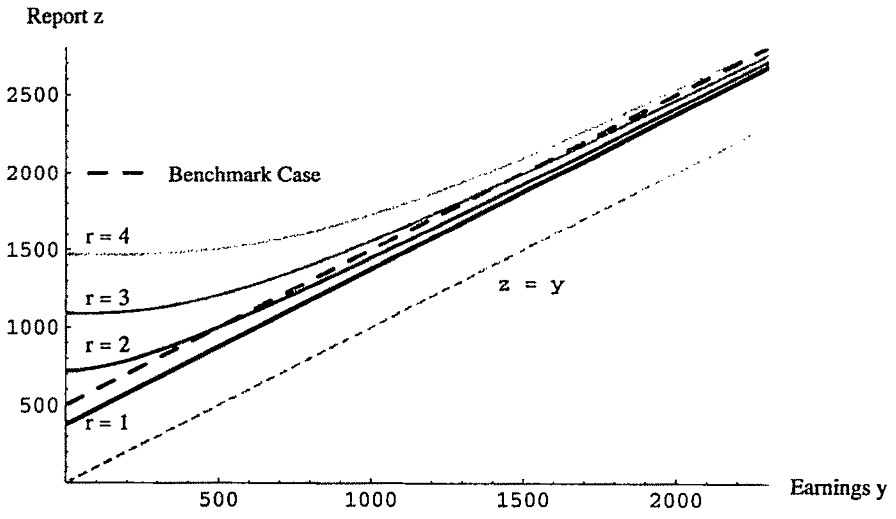
[14] Our estimation routines, using the *Mathematica* software package, are available from the authors upon request. Borrelli and Coleman (1998) and Erard and Feinstein (1994) discuss the issues related to numerical estimation of solutions to differential equations.

FIGURE 1

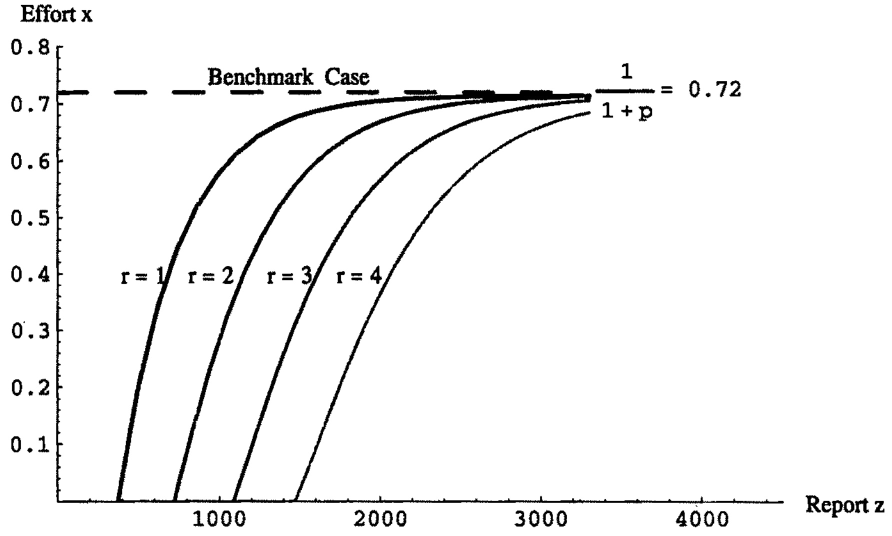
Report z as a Function of Earnings y

A Comparison of Management's Reporting Strategies when Expected Earnings Increases (r increases in the gamma distribution) Relative to the Benchmark Case[a]



[a] Each of the solid lines above depicts a z[y] graph when $\tilde{y}$ is distributed as a gamma distribution with $\alpha = 0.001$ and r ranging from $r = 1$ to $r = 4$. Note that the gamma with $r = 1$ is equivalent to the exponential distribution.

FIGURE 2
Audit Effort x as a Function of Report z
A Comparison of the Auditor's Effort Strategy when Expected Earnings Increases (r increases in the gamma distribution) Relative to the Benchmark Case[a]



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[a] Each of the solid lines above depicts a x[z] graph when $\tilde{y}$ is distributed as a gamma distribution with $\alpha = 0.001$ and r ranging from r = 1 to r = 4. Note that the gamma with r = 1 is equivalent to the exponential distribution.

with the auditor's cost of undetected overstatement, and the auditor trades this cost for effort costs in deciding his effort level.

The two significant effects of the earnings distribution on our prior results are that (1) reports generally are not linear functions of underlying earnings, and (2) inherent risk is not a constant function of reported earnings. Linearity of reports for the exponential case permits the description of equilibrium strategies as closed-form functions. Generally such solutions cannot be obtained for other distributions. However, most of the qualitative conclusions in Sections III and IV appear to be robust to the gamma family of distributions.

VI. CONCLUSIONS

SAS No. 82 requires that auditors consider fraud risk factors, including the magnitude of reported earnings, in assessing the risk of fraud and in audit planning. In our setting, the auditor receives an earnings report from a possibly fraudulent auditee and uses that report to revise his beliefs about the likelihood of fraud; he then bases subsequent audit plans on his revised beliefs. The auditee is informationally advantaged, knowing both his incentive-type (fraudulent or honest) and earnings-type (the underlying earnings without misstatement). In addition, the auditee knows the auditor's beliefs and understands how the auditor responds to various reports. In this setting, the fraudulent auditee is able to select a report that increases his own expected payoff relative to the setting in which no report is observed by the auditor before finalizing audit plans.

We also consider how model parameters affect both the auditor's strategy and the fraudulent auditee's reporting strategy. Generally, these strategies behave as one would expect (e.g., an increase in audit cost reduces the extent of auditing and increases the extent of overstatement), suggesting that the model structure is "reasonable."

Because risk issues pervade the professional literature on audit planning, we consider how detection risk, inherent risk, and audit risk are affected when the auditor observes management's earnings report. Surprisingly, we find (in the case of exponentially distributed earnings) that all three measures of risk increase when the auditor uses reported earnings to plan substantive audit tests relative to a setting in which the auditor does not observe reported earnings. On the other hand, we find that the extent of a fraudulent auditee's overstatement decreases. While our results regarding audit risk and the extent of overstatement depend on the earnings distribution assumption, the net impact on the auditee's expected payoff is unequivocally positive for any distribution. We do not interpret this finding as suggesting that the auditor should not use the observed earnings report in audit planning—indeed, when audit plans are based on information that is not influenced or controlled by management, that information improves the auditor's ability to detect or deter fraudulent reporting. In addition, the auditor cannot commit to ignore the auditee's report, so that once the report is issued, he rationally considers it because it contains information relevant to audit planning.

Of course, our model is simpler than real audit settings, which may potentially limit the implications of our analysis. For example, we assume that the auditee knows the auditor's technology and beliefs. In an alternative representation of our model, the auditor could have private information about technology or beliefs. One way to represent private information about the audit technology would be to include more than one auditor cost-type by varying audit cost across auditors. The auditor knows his own cost-type, but the auditee remains uncertain about cost. The equilibrium solution to such a formulation would require simultaneous solutions to multiple differential equations (one for each auditor cost-type), and tractability becomes an issue.

Another simplifying assumption we use is that the audit fee is fixed. Alternatively, the audit fee could vary according to the auditor's assessment of the likelihood that the auditee is fraudulent (i.e., higher risk audits result in higher fees). Varying audit fees could affect the auditor's strategy if, for example, a multiperiod model includes the loss of future fees when the auditor mistakenly claims that this period's report is fraudulent and is replaced with another auditor. In addition, if the negotiated fee varies based on auditee-type, it might provide additional information beyond the auditee's report. If so, the auditor would need to update his beliefs based on both the fee and report. How these limitations, among others, affect our results is difficult to predict given the complexities they introduce. Nevertheless, a central conclusion of our analysis—that management can use the report to its own benefit—seems unlikely to be ameliorated by environmental complexity. In fact, more complex settings likely offer more opportunity for the auditee to exploit his superior information about earnings and his own fraud incentives.

APPENDIX

This Appendix contains a detailed derivation of equation (6) and proofs of the paper's propositions.

Derivation of Equation (6)

Given a z, we know that y is either $y_{NF}[z]$, the y value that gives a reported z by an honest-type auditee (denoted by NF subscript), or $y_F[z]$, the y value that gives a reported z by a fraudulent-type auditee (denoted by F subscript). Therefore, by Bayes' rule, we have (where "Pr" indicates probability and $f(\cdot)$ is the prior density over y):

$$\Pr(F|z) = \frac{\Pr(z|F)P(F)}{\Pr(z|NF)\Pr(NF) + \Pr(z|F)P(F)}.$$

Unless ambiguous, we will denote $y_F[z] = y[z]$. Since $y_{NF} = z$ and $dy_{NF}/dz = 1$, we can write $\Pr(z|NF)$ as $f(y_{NF})\,(dy_{NF}/dz) = f(z)$ and $\Pr(z|F)$ as $f(y[z])\,|dy[z]/dz| = f(y[z])|y'[z]|$ (using the monotone change of variable theorem [see Meyer 1970, 88]). This allows us to rewrite $\Pr(F|z)$ as:

$$\Pr(F|z) = \frac{f(y[z])|y'[z]|P(F)}{f(z)(1 - P(F)) + f(y[z])|y'[z]|P(F)}. \tag{6}$$

Proof of Proposition 1

The auditor's cost function can be written as:

$$A(x) = (1 - x)[E(\tilde{z}) - E(\tilde{y})] + xc,$$

where, using F to denote a fraudulent auditee and NF to denote an honest auditee:

$$\begin{aligned} E(\tilde{z}) &= E(\tilde{z}|F)P(F) + E(\tilde{z}|NF)(1 - P(F)) \\ &= E(\tilde{z}|F)P(F) + E(\tilde{y})(1 - P(F)). \end{aligned}$$

Thus, we can rewrite A(x) as:

$$A(x) = (1 - x)[E(\tilde{z}|F)P(F) - E(\tilde{y})P(F)] + xc.$$

The auditor's first-order condition is:

$$P(F)(E(\tilde{z}|F) - E(\tilde{y})) - c = 0, \tag{17}$$

which is satisfied if the fraudulent-auditee's reporting strategy is $z = y + [c/P(F)]$. The fraudulent-auditee's first-order condition is:

$$(1 - x) - xp = 0, \tag{18}$$

which is satisfied if $x = 1/(1 + p)$.

Proof of Lemma 1

1) The fraudulent auditee's payoff (4) can be restated as:

$$\begin{aligned} M(z) &= ((1 - x[z])(1 + p) - p)(z - y) \\ &= \left((1 - x[z]) - \frac{p}{1 + p}\right)(z - y)(1 + p). \end{aligned}$$

Suppose $x[z] > 1/(1 + p)$. Then $M(z) < 0$ for all $z > y$, and the auditee sets $z = y$, yielding $M(z) = 0$. For $z = y$, the auditor sets $x[z] = 0 < 1/(1 + p)$, which is a contradiction. Therefore, $x[z] \leq 1/(1 + p)$. The fraudulent auditee's first-order condition (9) can be rewritten as:

$$x'[z](z - y) + x[z] - \frac{1}{1 + p} = 0.$$

Because $x[z] - 1/(1 + p) \leq 0$, we must have $x'[z] \geq 0$. See (2) (following) which shows that $x'[z] \neq 0$ and thus, $x'[z] > 0$.

2) The fraudulent auditee's first-order condition (9) implies that:

$$y[z] = \frac{-1 + (1 + p)x[z] + (1 + p)z\, x'[z]}{(1 + p)x'[z]}$$

and thus:

$$y'[z] = \frac{2(1 + p)(x'[z])^2 - (-1 + (1 + p)x[z])\, x''[z]}{(1 + p)(x'[z])^2}$$

The fraudulent auditee's second-order condition is:

$$-x''[z](z - y)(1 + p) - 2x'[z](1 + p) \leq 0,$$

implying:

$$x''[z](z - y) + 2x'[z] \geq 0,$$

which must be satisfied for the pure reporting strategies we consider in this paper. In addition, the auditee's first-order condition implies that:

$$z - y = -\frac{-1 + (1 + p)x[z]}{(1 + p)x'[z]} \text{ and substituting into } y'[z]$$

we obtain:

$$y'[z] = \frac{2x'[z] + x''[z](z - y)}{x'[z]} \geq 0,$$

because the second-order condition must be satisfied. In addition, in order for the auditor to calculate Pr(F z) and for condition (8) to be satisfied, $-\infty < y'[z] < +\infty$ and $y'[z] \neq 0$. Thus $x'[z] \neq 0$ and $y'[z] > 0$.

Proof of Proposition 2

1) In the benchmark case, the auditor's expected cost can be written as:

$$A(x) = (1 - x)[E(\tilde{z}) - E(\tilde{y}) - c] + c.$$

The auditor's first-order condition requires that $E(\tilde{z}) - E(\tilde{y}) - c = 0$, resulting in $A(x) = c$. In the observable report case, the auditor's expected cost can be written as:

$$A(x) = (1 - x)[z - E(\tilde{y}|z) - c] + c.$$

The auditor's first-order condition requires that $z - E(\tilde{y}|z) - c = 0$, resulting in $A(x) = c$. Thus, the auditor's expected cost is not affected by the change in scenario.

2) In the benchmark case, the fraudulent auditee's expected payoff function is:

$$\begin{aligned} M(z) &= (1 - x)(z - y) - x(z - y)p \\ &= (z - y)(1 - x - xp). \end{aligned}$$

The auditee's first-order condition requires that $1 - x - xp = 0$, resulting in $M(z) = 0$. In the observable report case, the fraudulent auditee's expected payoff function is:

$$\begin{aligned} M(z) &= (1 - x[z])(z - y) - x[z](z - y)p \\ &= (z - y)(1 - x[z](1 + p)). \end{aligned}$$

The auditee's first-order condition (9) implies that:

$$z - y = \frac{1 - x[z](1 + p)}{x'[z](1 + p)}.$$

Substituting for $z - y$ into $M(z)$ gives:

$$M(z) = \frac{(1 - x[z](1 + p))^2}{x'[z](1 + p)} > 0,$$

because $x'[z] > 0$ by Lemma 1. Thus, the fraudulent-auditee's expected payoff increases with an observable report relative to the payoff with no observable report.

Proof of Proposition 3

If $P(F) = 1$, then the auditor's first-order condition (5) is satisfied if the fraudulent auditee's reporting strategy is $z = y + c$.

For $x[z] = (1 - e^{-(z-c)/c})/(1 + p)$ (and therefore, $x'[z] = e^{-(z-c)/c}/c(1 + p)$), the auditee's first-order condition (9) is satisfied.

Proof of Proposition 4

Take the dishonest auditee's strategy, $z[y] = y + z_{LB}$ (implying $y[z] = z - z_{LB}$ and $y'[z] = 1$), as given and substitute into condition (8) (the auditor's first-order condition). Simplifying yields:

$$\frac{P(F)}{1 - P(F)}(z_{LB} - c)e^{\alpha z_{LB}} = c,$$

which is satisfied if we select z_{LB} to satisfy (11).

Next, take the auditor's strategy, $x[z] = (1 - e^{-(z-z_{LB})/z_{LB}})/(1 + p)$ (implying $x'[z] = [1/z_{LB}(1 + p)]e^{-(z-z_{LB})/z_{LB}}$), as given and substitute into condition (9) (the auditee's first-order condition):

$$\frac{1}{z_{LB}(1 + p)} e^{-(z-z_{LB})/z_{LB}} (z - y)(1 + p) + \frac{1 - e^{-(z-z_{LB})/z_{LB}}}{1 + p} (1 + p) - 1 = 0$$

This condition is satisfied for $z[y] = y + z_{LB}$.

Proof of Proposition 5

1) From Proposition 1, audit effort in the no-observable-report case is:

$$x = \frac{1}{1 + p}.$$

From Proposition 4, audit effort in the observable report case is:

$$x[z] = \frac{1 - e^{-(z-z_{LB})/z_{LB}}}{1 + p}.$$

Thus, the difference in audit effort is:

$$x[z] - x = -\frac{e^{-(z-z_{LB})/z_{LB}}}{1 + p} < 0.$$

2) From Proposition 1, the auditee's linear-reporting strategy is:

$$z = y + \frac{c}{P(F)}.$$

From Proposition 4, the auditee's linear-reporting strategy is:

$$z[y] = y + z_{LB},$$

where z_{LB} satisfies $\frac{P(F)}{1 - P(F)} (z_{LB} - c)e^{\alpha z_{LB}} = c$.

Rearranging the requirement for z_{LB}, we have

$$z_{LB} = \frac{(1 - P(F))c}{P(F)} e^{-\alpha z_{LB}} + c.$$

Thus, the difference in the amount reported is:

$$z_{LB} - \frac{c}{P(F)} = c(1 - e^{-\alpha z_{LB}}) \left(1 - \frac{1}{P(F)}\right) < 0,$$

since $e^{-\alpha z_{LB}} < 1$ and $P(F) < 1$.

Proof of Proposition 6

1) First, consider inherent risk. We denote the change in inherent risk as ΔIR.

$$
\begin{aligned}
\Delta IR &= \left(\frac{P(F)e^{-\alpha(z-z_{LB})}}{(1-P(F))e^{-\alpha z}+P(F)e^{-\alpha(z-z_{LB})}}\right) - P(F) \\
&= \left(\frac{(1-P(F))P(F)}{(1-P(F))e^{-\alpha z}+P(F)e^{-\alpha(z-z_{LB})}}\right)\left(e^{-\alpha(z-z_{LB})} - e^{-\alpha z}\right) \\
&> 0.
\end{aligned}
$$

2) Next, consider detection risk. We denote the change in detection risk as ΔDR.

$$
\Delta DR = \frac{e^{-(z-z_{LB})/z_{LB}} + p}{1+p} - \frac{p}{1+p} > 0.
$$

3) Because audit risk is the product of inherent risk and detection risk, which both increase if the report is observable, audit risk must also increase.

REFERENCES

American Institute of Certified Public Accountants (AICPA). 1997a. *Consideration of Fraud in a Financial Statement Audit.* Statement on Auditing Standards No. 82. New York, NY: AICPA.

———. 1997b. *Codification of Statements on Auditing Standards (Including Statements on Standards for Attestation Engagements), Numbers 1 to 82.* New York, NY: AICPA.

———. 1997c. *Considering Fraud in a Financial Statement Audit: Practical Guidance for Applying SAS No. 82.* New York, NY: AICPA.

Bloomfield, R. 1995. Strategic dependence and inherent risk assessments. *The Accounting Review* (January): 71–90.

Borrelli, R., and C. Coleman. 1998. *Differential Equations: A Modeling Perspective.* New York, NY: John Wiley & Sons, Inc.

Caplan, D. 1999. Internal controls and the detection of management fraud. *Journal of Accounting Research* 37 (Spring): 101–117.

Casella, G., and R. L. Berger. 1990. *Statistical Inference.* Belmont, CA: Duxbury Press.

Chatterjee, K., and S. Morton. 1998. Strategic audit policies without commitment. Working paper, Pennsylvania State University.

Erard, B., and J. S. Feinstein. 1994. Honesty and evasion in the tax compliance game. *RAND Journal of Economics* 25 (Spring): 1–19.

Fudenberg, D., and J. Tirole. 1992. *Game Theory.* Cambridge, MA: MIT Press.

KPMG. 1999. *1998 Fraud Survey.* New York, NY: KPMG.

Matsumura, E., and R. Tucker. 1992. Fraud detection: A theoretical foundation. *The Accounting Review* (October): 753–782.

Meyer, P. 1970. *Introductory Probability and Statistical Applications.* Reading, MA: Addison-Wesley Publishing, Inc.

Morton, S. 1993. Strategic auditing for fraud. *The Accounting Review* (October): 825–839.

Newman, P., and J. Noel. 1989. Error rates, detection rates, and payoff functions in auditing. *Auditing: A Journal of Practice & Theory* (Supplement): 50–63.

———, S. Rhoades, and R. Smith. 1996. Allocating audit resources to detect fraud. *Review of Accounting Studies* 1 (2): 161–182.

Noel, J., and E. Patterson. 2000. Audit strategies and multiple fraud opportunities of misreporting and defalcation. Working paper, SUNY at Buffalo.

Rhoades, S. 1999. The impact of multiple component reporting on tax compliance and audit strategies. *The Accounting Review* 74 (1): 63–85.

Sansing, R. 1993. Information acquisition in a tax compliance game. *The Accounting Review* 68 (4): 874–884.

Shibano, T. 1990. Assessing audit risk from errors and irregularities. *Journal of Accounting Research* (Supplement): 110–140.

Smith, R., S. Tiras, and S. Vichitlekarn. 2000. The interaction between internal control assessment and substantive testing in audits for fraud. *Contemporary Accounting Research* 17 (2): 327–356.

THE ACCOUNTING REVIEW
Vol. 76, No. 1
January 2001
pp. 81–97

Knowledge Acquisition in Auditing: Training Novice Auditors to Recognize Cue Relationships in Real Estate Valuation

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ABSTRACT: This study examines novice auditors' knowledge acquisition. I investigate whether low-cost, informal training interventions improve knowledge acquisition in complex auditing tasks. I designed an experiment that tests the effect of two alternative training approaches on audit judgment performance: explanatory feedback (a replication and extension of Bonner and Walker [1994]), and self-explanation of the rationale underlying a judgment of reasonableness. The results suggest that each approach promotes procedural knowledge acquisition, and combining the two approaches provides more benefit than either approach alone. The effectiveness of the self-explanation approach is primarily attributable to the learner's level of reasoning. Adding explanatory feedback to self-explanations has no incremental effect after controlling for the effect of the learner's reasoning. The paper discusses the implications of these results for the design of audit training environments.

Key Words: *Auditing, Training, Cognition.*

Data Availability: *Data are available from the author upon request.*

I wish to express my appreciation to Vicky Hoffman (dissertation chair) and the rest of my dissertation committee, including Micki Chi, Jake Birnberg, and Donald Moser, for their valuable assistance. I would also like to acknowledge individuals from two international public accounting firms for providing subjects, and the financial support of the Deloitte & Touche Foundation. In addition, I want to thank Mark Nelson (Associate Editor) and an anonymous reviewer for their helpful suggestions and comments. Finally, I would like to acknowledge the helpful comments of Noah Barsky, Stan Biggs, Amy Dunbar, Jennifer Joe, Andy Rosman, Rick Tubbs, and workshop participants at the University of Colorado, University of Connecticut, Indiana University, University of Maryland, University of Washington, and the Boston Area Research Colloquium (BARC), as well as attendees of the Business Measurement and Assurance Services (BMAS) conference at The University of Texas, and attendees of the 1999 AAA Annual Meeting.

Submitted May 1999
Accepted August 2000

I. INTRODUCTION

The public accounting environment is changing rapidly, with an increased emphasis on complex decision-making and problem-solving skills. Firms are providing more general "assurance services," and even the traditional audit is changing as firms develop new "strategic systems audit" approaches (AICPA 1999). These new audit approaches (e.g., business risk analyses or business performance measurement) require auditors to have more knowledge of particular industries and to rely more heavily on analytical skills (Elliott 1998; Bell et al. 1997). Firms therefore need insight on training novice auditors to acquire complex analytical skills.

Acquiring these skills requires auditors to rely on their *procedural* knowledge, which "consists of the rules or steps needed for performing skilled tasks" (Bonner and Walker 1994, 158). Procedural knowledge is acquired on the job, where novice auditors learn procedural skills through personal experience or through observing other, more experienced auditors. Despite the importance of understanding how auditors acquire such knowledge, very little research has examined how learning occurs in audit settings. One exception, Bonner and Walker (1994), found that a combination of up-front instruction and explanatory feedback concerning why a given answer was correct helped novice auditors gain procedural knowledge. However, Bonner and Walker noted that these training interventions might be costly to use on actual audit engagements. For example, explanatory feedback such as Bonner and Walker provided in their study is likely to be costly because it requires significant involvement of the trainer, who is generally a more senior auditor.

My study assesses the effectiveness of two low-cost training interventions. The study builds on Bonner and Walker (1994) by examining whether providing explanatory feedback in a different, potentially more cost-effective form still promotes the acquisition of procedural knowledge. I also investigate the effectiveness of a second training intervention, self-explanation, which may prove more cost-effective than providing explanatory feedback.

The study tests three hypotheses. First, I hypothesize that giving novice auditors explanatory feedback in summary form, by making them aware of patterns in information or relations among cues, will help them perform better on a novel set of judgment tasks than novices who did not receive the same kind of feedback. Second, I predict that auditors who first explain the underlying pattern of cues by themselves will perform better on a novel set of judgments than will those who do not self-explain. Third, I predict that combining both training interventions will lead to better performance than either training intervention alone.

I tested the hypotheses in an experiment with two manipulated factors: Explanatory Feedback (provided or not provided) and Self-explanation (elicited vs. not elicited). One hundred fifty auditors who were novices with respect to the study's real estate valuation task participated. Consistent with the first hypothesis, making novices aware of patterns by providing them with explanatory feedback in summary form improved their performance on posttest problems. Consistent with the second hypothesis, the self-explanation training intervention also improved performance. Moreover, I found the effectiveness of self-explaining depended on the auditor's level of reasoning, in that auditors who made links between items of information and/or related the items to each other in terms of an overall pattern or "story" (i.e., those exhibiting a high reasoning level) showed greater improvements from self-explaining than did auditors who did not make links between cues or who focused on one cue exclusively (i.e., those exhibiting a low reasoning level). Overall, the combination of self-explanation and explanatory feedback was more effective than either training intervention alone (consistent with the third hypothesis). However, when I controlled for the auditor's reasoning level, the combination of the two interventions was no more effective than the self-explanation intervention alone. This implies that, when accompanied by a high level of reasoning from the learner, the self-explanation training intervention does not require additional explanatory feedback to be effective.

The rest of this paper is organized as follows: The next section presents background information and develops hypotheses. The third section outlines the method, and the fourth section presents the results. The fifth section discusses the implications of these results for future research and for audit practice.

II. THEORY AND HYPOTHESES DEVELOPMENT

Knowledge Acquisition in Auditing

Bonner and Walker (1994) investigate how auditors learn under various training conditions. They exposed their participants to various types and combinations of instruction and feedback while training them to perform a complex ratio-analysis task. Their main findings indicate that explanatory feedback (explaining to the learner why the given answer was correct), coupled with up-front instruction using "understanding" rules promoted the greatest degree of procedural knowledge acquisition. However, Bonner and Walker (1994) note that providing both understanding rules and explanatory feedback may be impractical to implement in practice.

Bonner and Walker (1994) also found that explanatory feedback alone promoted the acquisition of procedural knowledge. However, they again noted that explanatory feedback could be costly to implement in practice because seniors are often too busy to provide feedback to novice auditors as they progress through their work (i.e., step-by-step feedback). Other types of low-cost feedback, such as outcome feedback (simply providing the correct answer without explanation) were not effective without prior instruction. This result is consistent with other studies in auditing (see discussion in Ashton 1982) and psychology (e.g., Remus et al. 1996; Balzer et al. 1992). However, Bonner and Walker (1994) did find that outcome feedback *was* as effective as explanatory feedback when preceded by understanding-rules instruction.

What types of low-cost training interventions are likely to work in practice? Bonner and Walker's (1994) results indicate that if trainers provide up-front instruction using understanding rules, outcome feedback during practice is an acceptable substitute for explanatory feedback. This type of instruction occurs when the audit firm provides task-specific training before auditors are required to perform the tasks on an audit engagement. However, some tasks are not addressed during formal training, and others must be performed before auditors can obtain formal training. In addition, it may be impractical for firms to provide formal training for all audit tasks. This study addresses the training situation typical of many audits: the auditor receives no up-front instruction, and must acquire procedural knowledge during the actual audit engagement.

Explanatory Feedback and Learning from Worked Examples

The field of psychology offers evidence on the way students "learn by doing," giving insight into how auditors can learn effectively in settings that do not allow for up-front instruction. For example, numerous studies in cognitive psychology address how individuals learn from studying worked examples in a variety of domains (Chi, Bassok, et al. 1989; VanLehn 1996; Sweller and Cooper 1985; Renkl et al. 1998). The general finding is that an individual can abstract the underlying features of a problem even from studying only one example, and can then use this knowledge to solve new problems (Zhu and Simon 1987; Chi, Bassok, et al. 1989).

Researchers have found that subjects learn best when the trainer (or the textbook) makes explicit the underlying relations among cues. If a trainer makes the structure of a problem obvious by requiring subjects to abstract the relevant underlying features from examples, the subjects are then better able to solve unrelated problems (Gick and Holyoak 1980, 1983). Although subjects could learn from studying just a few examples and then transfer their knowledge to novel contexts, they could do so only when the examples explained *why* certain information was important (Chi, Bassok, et al. 1989; Chi, deLeeuw, et al. 1994). Indeed, several psychologists have concluded that successful learning requires that examples show the rationale for applying each procedural step (Chi and Bassok 1989, 261), and that the underlying rules be explicitly taught (Voss 1987).[1]

The majority of psychology studies of learning from worked examples has taken place in task settings using examples similar to textbook word-problems. These examples are considered "well-structured," in that each has an objectively correct answer and an accepted solution procedure that can be modeled in the example. In auditing, the majority of complex tasks are "ill-structured" in that few have an objectively correct answer. Thus, the auditor's reasoning process is likely more important than the particular steps he or she follows. Bonner and Walker's (1994) results regarding explanatory feedback and understanding rules demonstrate that cognitive psychology's results from well-structured learning tasks do apply in the rather ill-structured auditing domain. Explaining to auditors *why* a given answer is correct helps them to acquire procedural knowledge. The trainer may give the explanation either before the example problem has been worked (as in the case of up-front instruction) or afterward (as in the case of explanatory feedback). In either case, making explicit the underlying patterns of information enhances the novice's ability to learn procedural knowledge.

The current experiment replicates Bonner and Walker (1994) by incorporating an explanatory-feedback condition. It also extends Bonner and Walker (1994) by modifying the explanatory feedback so that it is more cost effective. Instead of using immediate, step-by-step explanatory feedback, the current study uses summary feedback that is delayed until after the novice has attempted several examples. I still expect providing explanations in this less-costly manner to effectively promote the acquisition of procedural knowledge, because the value in the explanation is that it makes the underlying relations among the cues explicit. Thus, I propose the following hypothesis:

> **H1:** Novice auditors who receive explanatory feedback on the underlying relations among cues in the examples will perform better on a novel set of problems than will novice auditors who do not receive explanatory feedback on the underlying relations among cues.

The Self-explanation Effect

In addition to identifying crucial features of worked examples, researchers in psychology have identified important differences among the learning styles of students who use worked examples effectively. Chi, Bassok, et al. (1989) found that successful learners tended to use examples when they ran into difficulty with new problems. These individuals engaged in active learning, whereby they attempted to construct their own explanations for why the answer given in the worked example was correct, rather than copy the solution to the problem step by step. Chi, Bassok, et al. (1989) used the term "self-explanation effect" to describe the phenomenon.

---

[1] Renkl (1999) uses the term "instructional explanations" to refer to explanations from sources external to the learner (such as teachers or tutors). He notes that in certain types of learning situations, instructional explanations can be particularly effective because they provide learners with the appropriate feedback during learning, enabling them to assess whether their understanding of the problem is correct and allowing them to abstract underlying features or principles from examples.

Other studies have examined the self-explanation effect in different contexts and found it to be robust. In early protocol analysis studies similar to Chi, Bassok, et al. (1989), researchers simply asked students to study various examples or to read from text, then contrasted the good learners with the poor learners (e.g., Chi and Bassok 1989; Pirolli and Recker 1994; Renkl 1997). Later studies manipulated whether the researcher prompted the subject to explain his or her answers or simply instructed him or her to "think aloud," and then identified qualitative differences between the explanations of the two groups (e.g., Chi, deLeeuw, et al. 1994; Neuman and Schwarz 1998).

Renkl et al. (1998) was the first study to test experimentally the effect of self-explanations in combination with learning from worked examples. This study was also the first to provide participants in the self-explanation group with up-front training in how to self-explain, rather than just prompting participants to construct their own self-explanations spontaneously. Renkl et al. (1998) compared two different types of examples: (1) those indicating "near transfer" (solving new problems that are similar in structure to the original), and (2) those indicating "far transfer" (solving new problems with a different underlying structure). Renkl et al. (1998) found that when subjects lacked a great deal of prior knowledge of the topic, self-explaining improved their performance on both near and far transfer problems. Thus, I expect elicited self-explanations to improve the performance of novice auditors (who have a low degree of prior topic knowledge) when they are learning from worked examples.

Researchers have attributed the superior performance of self-explainers to the fact that they expend more cognitive effort toward understanding the example before solving the target problem (Chi and Bassok 1989); this explanation is consistent with the principle that active learning can be more beneficial than passive learning (e.g., Webb 1980; Merrill et al. 1992). Indeed, Chi, deLeeuw, et al. (1994) noted that those students who exhibited more effort by producing a high number of statements (or "elaborations") during the learning phase of the study performed better on the posttest than did those students who produced a low number of elaborations during learning.

Several auditing studies have investigated the link between cognitive effort and audit judgment performance. Some of these studies have shown that making auditors provide justifications or written explanations for their judgments increased the level of effort they expended, which, in turn, seems to improve performance in some cases (Peecher 1996; Tan 1995; Koonce 1992). As Peecher (1994) noted, two components of justifications are expected to increase effort: an explanation component and an accountability component. For example, individuals who are providing self-explanations often feel no need to *defend* those explanations, whereas individuals providing justifications know that they may be called upon to defend their position. It is often difficult to predict whether accountability will increase or decrease cognitive effort, due to the confounding social pressures it introduces (see Tetlock 1985). To reduce the potentially confounding effect of accountability, participants in the current study are prompted to provide self-explanations only; they are not told that their self-explanations will be reviewed by another individual, as in previous auditing studies.

The prior psychology literature suggests that requiring novice auditors to self-explain will promote their acquisition of procedural knowledge. However, previous self-explanation studies have used well-structured tasks or tasks such as text comprehension that are fundamentally different from the problems auditors encounter.[2] The current study examines whether eliciting self-explanations will improve participants' procedural knowledge acquisition in auditing. I propose the following hypothesis:

H2: Novice auditors who are required to "self-explain" the pattern underlying judgments of reasonableness will perform better on a novel set of problems than will novice auditors who are not required to self-explain.

Combining Explanatory Feedback with Self-explanations

To date, no studies have examined the joint effects of explanations originating from sources external to the learner (e.g., instructional explanations or explanatory feedback) and explanations that are constructed by the learner (self-explanations). Renkl (1999) notes that previous self-explanation effect research is based on the premise that self-explanations are superior to instructional explanations because self-explanations require the learner to actively construct his or her own understanding of the problem. However, he notes that both self-explanations and instructional explanations have strengths and limitations. Instructional explanations may not appropriately match the learner's previous knowledge of the domain, or the timing of the explanation may be inappropriate (may come at such a point in the problem-solving process that it confuses or is simply meaningless to the learner). Self-explanations are limited in that the learner may unwittingly self-explain the wrong answer. Furthermore, self-explainers may be able to determine the correct answer, but not truly understand the problem, or may think they understand the problem when they do not. Renkl (1999) calls for additional research combining training interventions, speculating that combining self-explanation with instructional explanation may overcome the difficulties of either intervention alone. Thus, I propose an additional hypothesis that predicts that combining these two types of training interventions will be more effective than either the explanatory feedback (H3a) or the self-explanation (H3b) intervention alone.

H3a: Novice auditors who self-explain *and* receive explanations regarding the underlying relations among cues in examples will perform better on a novel set of problems than will novice auditors who *receive only explanations* regarding the underlying relations among cues.

H3b: Novice auditors who self-explain *and* receive explanations regarding the underlying relations among cues in examples will perform better on a novel set of problems than will novice auditors who *only self-explain* the underlying relations among cues.

Figure 1 summarizes the predictions for H1, H2, and H3a and H3b.

III. METHOD

Participants

Participants included 159 auditors from two international public accounting firms, each with an average experience of 1.3 years (standard deviation = 1.6). Participants were attending a national training session for their respective firms. The responses of five participants who did not fully complete the experimental materials were excluded. The auditors

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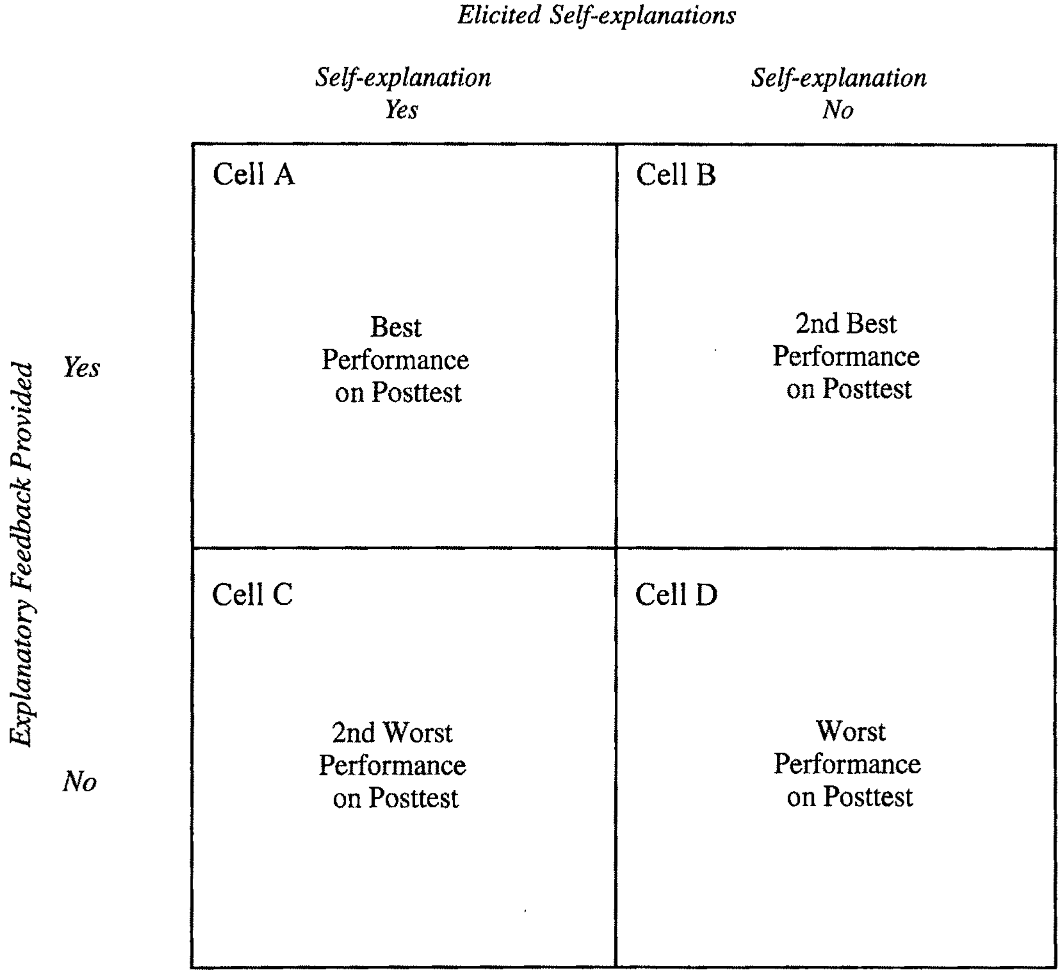
[2] Renkl et al. (1998) used a task similar to that performed by novice auditors: bank apprentices learning interest rate calculations. However, the task was more well structured than the task used in the current study, and the up-front training in self-explanation methods provided to participants represented a more costly training intervention than simply requiring them to generate their own spontaneous or naturally occurring self-explanations.

FIGURE 1
Predicted Effects of Explanatory Feedback and Self-explanation on Posttest Performance



Explanatory Feedback Provided	*Elicited Self-explanations* *Self-explanation* *Yes*	 *Self-explanation* *No*
Yes	Cell A Best Performance on Posttest	Cell B 2nd Best Performance on Posttest
No	Cell C 2nd Worst Performance on Posttest	Cell D Worst Performance on Posttest

H1: A + B > C + D Main effect of Explanatory Feedback.
H2: A + C > B + D Main effect of Self-explanation.
H3a: A > B Combination of both factors greater than Explanatory Feedback alone.
H3b: A > C Combination of both factors greater than Self-explanation alone.

answered a series of questions regarding their experience with valuation testwork, real estate engagement experience, and knowledge of discounted cash flow (DCF) concepts to determine if they could be classified as novices with respect to the task. Four of the participants indicated that they had performed valuation testwork on more than five properties in the past year, so they were excluded from analysis because they were not considered novices with respect to the task.

Because I administered the experiment over the course of three experimental sessions, with different conditions included during different administrations of the experiment, pure random assignment across conditions was not possible. Analyses on the demographic characteristics of the participants indicated no significant differences among participants from one experimental condition to another.[3] Referring to the 2 × 2 experimental design in Figure 1, I assigned subjects randomly across Cells B and D in the first session, across Cells A and B in the second session, and across all four cells in the third session.[4] Of the 150 participants, 37 were in Cell A, 39 were in Cell B, 34 were in Cell C, and 40 were in Cell D.

Task Materials

The task required participants to analyze the discount rate for each of four income-producing office properties.[5] (The Appendix presents an example of one property case.) Participants assessed whether the discount rate given was "Reasonable" or "Not Reasonable." If they answered "Not Reasonable," then they provided a reasonable range for the rate. They based their assessments on summary background information about each property and the discount rate used in valuing the property (per an outside appraisal). They also received industry information on the range of acceptable discount rates for each property's geographic location. To ensure task realism, I used actual audited properties as the source for industry information, discount rates, and individual property information comprising each case.

A manager from an international public accounting firm helped develop the case materials. Two of the cases provided the actual audited discount rates, and for these two properties I presume that the correct answer was "Reasonable." For the other two properties, I adjusted the discount rate up or down from the actual audited value, and for these two cases the answer was "Not Reasonable" (too high in one case and too low in the other). This allowed for a criterion measure in evaluating the participants' responses as "correct" or "not correct."[6]

Design and Procedure

The design was a 2 × 2 full factorial. As depicted in Figure 1, the two manipulated factors were Explanatory Feedback (provided or not provided) and Self-explanation (elicited vs. not elicited). I administered the experiment as a pretest-treatment-posttest. Participants saw four pretest cases, four treatment cases (the same as the pretest cases), and four posttest cases, all of which were presented in a counterbalanced order. The pretest consisted of four property valuation cases, as previously described. After completing the pretest, the participants filled out a demographic questionnaire and answered a number of questions designed to test their knowledge of and experience with DCF analysis. They then received additional information about the cases during the training portion of the experiment. This information varied across the experimental conditions.

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[3] I performed additional t-tests to identify any significant pretest differences in each of the three sessions (on both an overall basis and within cells). I found no statistically significant differences.

[4] In the third session, participants were randomly assigned across all four treatment conditions. Although the unequal cell sizes precluded formal statistical analysis for this group, the pattern of cell means in the third session was consistent with the pattern for the entire sample (i.e., Cell A > Cell B > Cell C > Cell D).

[5] The task used in the current study requires participants to determine the reasonableness of the discount rate used in real estate valuation. This task requires the auditor to examine a number of cues and to combine the cues to arrive at an overall judgment of reasonableness, which constitutes a critical analytical skill.

[6] In addition to developing the cases from actual audited properties, I pilot-tested the cases on an additional manager, a partner, and two senior auditors. All four came to a consensus regarding the "correctness" of the solution, providing additional support for the criterion measure established herein. In addition, each of the pilot-test participants and the original manager who helped develop the cases provided independent explanations of the pattern or "story" underlying these judgments. I used these write-ups to establish the explanatory feedback given to the study participants.

Participants in Cell A (Explanatory Feedback [yes]; Self-explanation [yes]) first received summaries of (and outcome feedback for) each of the four properties from the pretest. I then asked them to self-explain the possible pattern of information underlying the correct judgment of reasonableness, and to record their self-explanation on the next (blank) page. After completing the self-explanation for each property, participants received explanatory feedback regarding the pattern of information used and the relations among cues noted by a more experienced auditor in reaching his or her decision of reasonableness.

Participants in Cell B (Explanatory Feedback [yes]; Self-explanation [no]) received both outcome feedback on the four properties and explanatory feedback on the pattern of information used by an expert (as in Cell A), but they were not required to self-explain the underlying pattern.

Participants in Cell C (Explanatory Feedback [no]; Self-explanation [yes]) received outcome feedback for the four properties. They then received instructions to self-explain the possible pattern underlying the judgments of reasonableness as in Cell A. After providing their self-explanations, they proceeded to the next property without receiving explanatory feedback on the pattern underlying the judgment of reasonableness.

Cell D (Explanatory Feedback [no]; Self-explanation [no]) was the control condition. Participants received outcome feedback on the four cases. They were told that an expert had evaluated the same properties, and they received the expert's judgments but no additional information as to why the expert made those judgments.

Once the participants completed the training portion of the study, I asked them to review four new cases and provide judgments as before (posttest measure).[7]

IV. RESULTS

Tests of Hypotheses

To test the hypotheses, I performed the analyses using participants' posttest scores in an analysis of covariance (ANCOVA), with Years of Experience and Pretest Scores as covariates.[8] Although the participants were novices with respect to the task, their years of general auditing experience ranged from less than one year (entry level) to seven years. To control for general auditing experience, Years of Experience was included in the model as a covariate. Table 1 reports the results of the ANCOVA.

Table 1 shows that the Years of Experience covariate is not significant, so the results are not due to general experience in auditing. Although the Pretest Score covariate is significant ($F = 7.77$, $p = 0.006$), indicating that higher (lower) pretest scores are associated with higher (lower) posttest scores, I still obtained significant results on the manipulated

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[7] The cases developed for the posttest were structurally similar to the original four cases. Although I changed the information regarding rates, dollar amounts, and geographic location to disguise the properties, the general pattern of cues was comparable from pretest to posttest.

[8] Cook and Campbell (1979, 183) argue that an ANCOVA approach with pretest score as a covariate is preferable to the use of difference score or "gain score analysis," because "in the randomized experiment, the gain score analysis is generally less precise than either the ANCOVA or the matching or blocking analysis." Nonetheless, an additional ANOVA on the *difference* scores yielded identical inferences. To further assess the appropriateness of using ANCOVA to test the experimental hypotheses, I ran two additional models: (1) a full ANCOVA model with all main effects, interaction between manipulated variables, and covariates; and (2) a reduced model ANCOVA with only the main effects and the interaction between the two manipulated variables. Because none of the interactions between the covariates and the manipulated variables in the full model was significant, the reduced model ANCOVA is appropriate for testing the study's hypotheses.

TABLE 1
ANCOVA Results for the Effect of Explanatory Feedback and Self-explanation on Posttest Performance

Source of Variation	*Sum of Squares*	*df*	*Mean Square*	*F*	*p-value*
Years of Experience[a]	0.01	1	0.01	0.06	0.808
Pretest Score[a]	6.79	1	6.79	7.77	0.006
Explanatory Feedback (EF)	10.21	1	10.21	11.69	0.001
Self-Explanation (SE)	9.88	1	9.88	11.30	0.001
EF × SE	1.03	1	1.03	1.18	0.279
Residual Error	125.80	144	0.87		

[a] Covariates included in model.

variables (see the following discussion) after controlling for pretest score. Therefore, the results are not due simply to performance on pretest.

The mean number of correct judgments for each group, the pretest means, and the marginal means appear in Figure 2 (note that the mean number of correct pretest and posttest judgments is out of four cases).

The first hypothesis predicts that making patterns explicit through explanatory feedback (in addition to providing outcome feedback) will result in greater learning than would not making the patterns explicit (a main effect of Explanatory Feedback). The ANCOVA results in Table 1 demonstrate a significant main effect of Explanatory Feedback ($F = 11.69$, $p = 0.001$), indicating that the provision of explanatory feedback facilitates learning.

The second hypothesis predicts that asking auditors to self-explain will result in greater learning than not asking them to self-explain. Again, the main effect of Self-explanation is significant ($F = 11.30$, $p = 0.001$), indicating that self-explaining also enhances learning. Additional analyses regarding the role of effort in self-explanation and its link to performance will be discussed shortly.

Hypothesis 3a predicts that combining the explanatory feedback and self-explanation interventions will result in greater learning than would: (1) providing explanatory feedback only (H3a: Cell A greater than Cell B), or (2) requiring novices to self-explain only (H3b: Cell A greater than Cell C). Figure 2 reports the differences in the means across these three cells.

Consistent with H3a, the mean number of correct responses in Cell A ($M = 3.43$, $sd = 0.65$) is greater than the mean in Cell B ($M = 3.10$, $sd = 0.91$; $t = 1.81$, $p = 0.04$, one-tailed). Similarly, consistent with H3b, the mean number of correct responses in Cell A ($M = 3.43$, $sd = 0.65$) is significantly greater than the mean in Cell C ($M = 2.97$, $sd = 0.97$; $t = 2.38$, $p = 0.01$, one-tailed).

Additional Analyses

Prior research suggests that the self-explainers' better performance is presumably due to more learning effort: more elaborations and comments indicating understanding of the problem (Chi, Bassok, et al. 1989), and "more principle-based explanations, more explication of operator-goal combinations, and more anticipative reasoning" (Renkl 1997, 1).

FIGURE 2
Pretest, Posttest, and Marginal Mean Results by Experimental Condition

Elicited Self-explanations

Explanatory Feedback Provided	*Self-explanation Yes*	*Self-explanation No*	
Yes	Cell A M = 3.43 (sd = 0.65) n = 37 (pretest M = 2.24)	Cell B M = 3.10 (sd = 0.91) n = 39 (pretest M = 2.15)	$\frac{A+B}{2} = 3.27$ $A-B = 0.33^*$
No	Cell C M = 2.97 (sd = 0.97) n = 34 (pretest M = 1.94)	Cell D M = 2.23 (sd = 1.19) n = 40 (pretest M = 2.23)	$\frac{C+D}{2} = 2.60$ $C-D = 0.74^*$
	$\frac{A+C}{2} = 3.23$ $A-C = 0.46^*$	$\frac{B+D}{2} = 2.64$ $B-D = 0.87^*$	

* Difference is significant at p (one-tailed) < 0.05.

Consequently, I examined and coded the written self-explanations with respect to the level of reasoning (coded as "High" versus "Low").[9] Table 2 lists examples of the coding rules and types of explanations coded as "High" or "Low."

To determine whether level of reasoning led to differential posttest performance, I performed an ANCOVA with two between-subjects factors: Reasoning (high vs. low) and Explanatory Feedback (provided or not provided). The model included both Pretest Scores

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[9] Both the author and another independent coder who was blind to the experimental hypotheses coded the explanations. Inter-coder agreement was 87 percent. Discussion reconciled disagreements between the two coders.

TABLE 2
Coding Criteria and Examples of Self-explanations

Code	*Criteria*	*Examples*
Reasoning—High	Explanation based on several cues related to each other in an overall pattern or "story."	*"100% occupancy with recent extension of leases with step up options. Improving economy. Higher rent rates but high ability to sign and keep tenants."*
	Explanation based on relation between property-specific cues and industry average rate.	*"Lease expiration is low in next 3 years. Current occupancy rate is 100%. The building is a trophy in the district. This indicates lower discount rate than market. However, market rate is appropriate because the 12% tenant is moving."*
Reasoning—Low	One cue or several cues listed with no relations mentioned or links made among cues.	*"Since the occupancy rate is 68.7%, 12% for the discount rate is reasonable."* *"High occupancy, low expirations."*
	Industry average mentioned, but no link to property-specific cues.	*"It is reasonable because it's in between the industry discount rate."*

and Years of Experience as covariates. This analysis included only participants from the self-explanation treatments as the reasoning score was based on self-explanation data.

The results of this analysis reveal a significant main effect of Reasoning (F = 11.12, p = 0.001). Participants who exhibited a higher level of reasoning in their self-explanations performed better on the posttest than did participants who exhibited a lower level of reasoning. None of the covariates is significant, and the main effect of Explanatory Feedback is not significant after controlling for Reasoning, Pretest Score, and Years of Experience.

As Bonner and Walker (1994) noted, the "impoverished" training environment of most audit engagements often makes it impractical to provide more than one type of training intervention. Thus, I performed a second *post hoc* analysis to determine the relative value of explanatory feedback vs. self-explaining. T-test results indicate that there is no statistically significant difference (t = 0.60, p = 0.28) between the two approaches, so there is no evidence to support one training intervention over another.[10]

I performed a final summary analysis on the six conditions (four conditions identified through the analysis of the Self-explanation participants, plus the Explanatory-Feedback-only and Outcome-Feedback-only conditions). Table 3 presents the pretest and posttest mean number of correct judgments and the difference score (an indicator of performance gains from pretest to posttest) for each condition. I rank-ordered each condition from highest to lowest by difference score.

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[10] In addition, further analysis reveals that simply providing the correct answer without explanation does not enhance learning. As noted in Figure 2, the mean for Cell D (Outcome Feedback only) is significantly lower than the means of Cells B and C at p-values of 0.05 or less. In addition, there was no difference in Cell D scores from pretest (M = 2.23, sd = 1.00) to posttest (M = 2.23, sd = 1.19). These results replicate Bonner and Walker's (1994) finding that outcome feedback alone does not result in learning.

TABLE 3
Performance Gains for Each Experimental Condition
(Ordered Highest to Lowest by Difference Score)

Condition	*n*	*Pretest Mean (sd)*	*Posttest Mean (sd)*	*Mean Difference Score*
1) Self-explanation with no Explanatory Feedback and High Reasoning	13	1.92 (0.76)	3.54 (0.66)	+1.62[a]
2) Self-explanation with Explanatory Feedback and High Reasoning	29	2.14 (1.06)	3.52 (0.57)	+1.38[b]
3) Explanatory Feedback only	39	2.15 (1.04)	3.10 (0.91)	+0.95[c]
4) Self-explanation with no Explanatory Feedback and Low Reasoning	21	1.95 (0.86)	2.62 (0.97)	+0.67[c]
5) Self-explanation with Explanatory Feedback and Low Reasoning	8	2.63 (0.52)	3.13 (0.83)	+0.50[c]
6) Outcome Feedback only	40	2.23 (1.00)	2.23 (1.19)	0

[a] Significantly greater than Conditions 3, 4, 5, and 6 at $\alpha = 0.05$.
[b] Significantly greater than Conditions 4, 5, and 6 at $\alpha = 0.05$.
[c] Significantly greater than Condition 6 only at $\alpha = 0.05$.

Table 3 shows that participants exhibiting high levels of reasoning had the largest performance gains. Explanatory Feedback did not incrementally enhance performance after controlling for reasoning level. Participants who exhibited low levels of reasoning in the Self-explanation condition performed worse than high-reasoning participants, ($\alpha = 0.05$).

V. DISCUSSION AND CONCLUSION

This study assesses the effectiveness of two alternative low-cost training interventions. As predicted, making patterns explicit through the provision of explanatory feedback improved novices' performance. This result is consistent with the results of prior studies on the use of hints in analogical transfer (Gick and Holyoak 1980, 1983) and the use of worked-out examples in problem solving. It also replicates and extends Bonner and Walker's (1994) results on explanatory feedback in knowledge acquisition.

As in Bonner and Walker's (1994) explanatory-feedback conditions, I gave participants in the Explanatory-Feedback condition an explanation of *why* the given answer was correct in addition to giving them outcome feedback. The main difference between Bonner and Walker (1994) and the current setting related to the timing of and amount of feedback given during learning. Bonner and Walker (1994) provided explanatory feedback immediately (that is, as each participant completed a step in the problem, a computer provided feedback on the correct answer). They also note that "the effectiveness of both outcome feedback and explanatory feedback may be diminished with delays" (Bonner and Walker 1994, 174). The feedback in this study is more delayed and less frequent than in Bonner and Walker (1994), and is administered in summary form (for all four cases at one time). Participants completed four pretest judgments, and answered a two-page debriefing and knowledge-related questionnaire before they began the training portion of the experiment, in which they received the correct answers in summary form for all four properties together. In addition, the Self-explanation condition participants provided self-explanations as an additional step before receiving feedback.

Goodwin (1998) suggests that although immediate feedback enhances performance in the short term, it may not result in long-term gains in performance. She notes that "frequent, immediate feedback benefits performance during practice" (Goodwin 1998, 223). However, she goes on to differentiate transient performance effects from "true learning effects," further noting that "providing feedback less frequently, eliminating it later in practice, and providing only summary feedback after a number of trials decreases performance in practice sessions, but leads to better learning; as assessed by retention, transfer, and generalization of skills" (Goodwin 1998, 224). Future research could assess whether delayed and summary feedback such as that used in this study enhances long-term retention and transfer.

Requiring novices to provide spontaneous self-explanations also increased learning. This result is consistent with results of previous studies in well-structured task domains. In addition, the tests of H3a and H3b demonstrate that overall the combination of instructional explanations (provided through explanatory feedback) and self-explanations led to the greatest learning gains. However, further analysis of the Self-explanation results indicated that reasoning level had more impact on the effectiveness of self-explanations than did explanatory feedback. Given that combining both interventions is costly, this result weakens Renkl's (1999) argument that trainers should combine instructional explanations and self-explanations to foster learning from worked examples.

Self-explanations work very well when participants exhibit a high level of reasoning; but when the level of reasoning is low, the performance gains are no different than with the provision of explanatory feedback alone. Future research could investigate whether high-level reasoning is a function of the learner's innate ability or cognitive style,[11] or whether it can be enhanced through up-front instruction (although in discussing his prior research efforts, Renkl [1999] notes that up-front instruction in self-explanation methods has been somewhat ineffective).

In situations with a great deal of time pressure, it may be costly to use self-explanation because of the extra time learners need to reason effectively. In addition, the self-explanation approach is likely to be less effective when the correct answer is not available. Participants in this study had to explain the rationale underlying the *correct* judgment, but there is evidence that providing explanations in support of an incorrect answer will result in little or no learning (Earley 1998).

The study's evidence suggests that providing explanatory feedback alone is moderately effective in promoting the acquisition of procedural knowledge, and lacks some of the limitations associated with self-explanations (of course, individuals who provide explanatory feedback must be aware of the patterns). Making relations among cues explicit during training can be achieved at very little cost. Prior years' workpapers can also provide instructional explanations, by explicitly highlighting the underlying structure supporting various conclusions that is useful to novice auditors.

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[11] For example, research in social psychology on integrative complexity has identified differences in individuals' reasoning styles (e.g., Suedfeld et al. 1992).

From a practical standpoint, informal, low-cost training methods, such as those described in this study, might benefit public accounting firms in that most knowledge acquisition in auditing occurs during on-the-job learning experiences. Making such experiences meaningful is important in an environment in which auditors must make complex judgments in a relatively short amount of time. As the auditing profession moves toward providing additional assurance services, and replacing traditional audits with strategic systems audit approaches, auditors must efficiently acquire the expertise to make complex analytical judgments.

APPENDIX
Experimental Instrument—Sample Case

BACKGROUND INFORMATION

Property Name:	Union Place	**Total Square Feet or Units**	349,179 SF
Appraised Value:	$50,100,000	**Year Built:**	1987
Location:	San Francisco (Central Business District)	**Risk-free Rate of Return**	1997 9% 1998 8% 1999 11%
Property Type:	Office (Class A)		

LEASING INFORMATION

Occupancy Rate:	95%	**Lease Expirations: (% of total square footage)**	1997 17% 1998 38% 1999 7%

MARKET INFORMATION

Competition:	Average vacancy rate in CBD is 10–12%. Average market rent per square foot of similar buildings in CBD is $15 to $26. Estimated demand of 800,600 additional square feet per year is expected, with the total vacant inventory in the area to be absorbed in 1.7 years.	**Other Factors:**	Expected volatility in the market in 1997 as office space leased by companies whose original space was damaged in the 1989 Loma Prieta earthquake is vacated by those tenants, who will move back into their original space.

ASSUMPTIONS

Discount Rate: (per appraisal)	11.25%	**Discount Rate: (per industry reports)**	11.0% to 11.7%

Instructions

Please evaluate the **discount rate per the appraisal** in light of the information about the property given above, and answer the following:

1. The discount rate per the appraisal is: **Reasonable** **Not Reasonable**
2. If you answered "Not Reasonable," was the discount rate (circle):
   Too High **Too Low**

   Please provide a reasonable range for the discount rate: ____________

REFERENCES

American Institute of Certified Public Accountants (AICPA). 1999. *Report of the Special Committee on Assurance Services*. New York, NY: AICPA. Retrieved June 6, 2000 from the Web at http://www.aicpa.org/assurance/scas/index.htm.

Ashton, R. H. 1982. *Human Information Processing in Accounting*. Sarasota, FL: American Accounting Association.

Balzer, W. K., L. M. Sulsky, L. B. Hammer, and K. E. Sumner. 1992. Task information, cognitive information, or functional validity information: Which components of cognitive feedback affect performance? *Organizational Behavior and Human Decision Processes* 53: 35–54.

Bell, T., F. Marrs, I. Solomon, and H. Thomas. 1997. *Auditing Organizations Through a Strategic-Systems Lens*. Montvale, NJ: KPMG Peat Marwick LLP.

Bonner, S. E., and P. L. Walker. 1994. The effects of instruction and experience on the acquisition of auditing knowledge. *The Accounting Review* 69 (1): 157–178.

Chi, M. T. H., M. Bassok, M. Lewis, P. Reimann, and R. Glaser. 1989. Self-explanations: How students study and use examples in learning to solve problems. *Cognitive Science* 13: 145–182.

———, and ———. 1989. Learning from examples via self-explanations. In *Knowing, Learning, and Instruction: Essays in Honor of Robert Glaser*, edited by L. B. Resnick. Hillsdale, NJ: Lawrence Erlbaum Associates.

———, N. deLeeuw, M. Chiu, and C. LaVancher. 1994. Eliciting self-explanations improves understanding. *Cognitive Science* 18: 439–477.

Cook, T. D., and D. T. Campbell. 1979. *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. Boston, MA: Houghton Mifflin Company.

Earley, C. 1998. Expertise acquisition in auditing: Training novice auditors to recognize cue relationships in real estate valuation. Ph.D. thesis, University of Pittsburgh.

Elliott, R. 1998. Assurance services and the audit heritage. *Auditing: A Journal of Practice & Theory* 17 (Supplement): 1–7.

Gick, M. L., and K. J. Holyoak. 1980. Analogical problem solving. *Cognitive Psychology* 12: 306–355.

———, and ———. 1983. Schema induction and analogical transfer. *Cognitive Psychology* 15: 1–38.

Goodwin, J. S. 1998. The interactive effects of task and external feedback on practice performance and learning. *Organizational Behavior and Human Decision Processes* 76 (3): 223–252.

Koonce, L. 1992. Explanation and counterexplanation during audit analytical review. *The Accounting Review* 67 (1): 59–76.

Merrill, D. C., B. J. Resier, M. Ranney, and J. G. Trafton. 1992. Effective tutoring techniques: A comparison of human tutors and intelligent tutoring systems. *The Journal of the Learning Sciences* 2 (3): 277–305.

Neuman, Y., and B. Schwarz. 1998. Is self-explanation while solving problems helpful? The case of analogical problem solving. *British Journal of Educational Psychology* 68 (1): 15–24.

Peecher, M. E. 1994. Consequentiality, justification, and auditors' decision processes: A theoretical framework and two experiments. Ph.D. thesis, University of Illinois at Urbana–Champaign.

———. 1996. The influence of auditors' justification processes on their decisions: A cognitive model and experimental evidence. *Journal of Accounting Research* 43 (1): 125–140.

Pirolli, P., and M. Recker. 1994. Learning strategies and transfer in the domain of programming. *Cognition and Instruction* 12 (3): 235–275.

Remus, W., M. O'Connor, and K. Griggs. 1996. Does feedback improve the accuracy of recurrent judgmental forecasts? *Organizational Behavior and Human Decision Processes* 66 (1): 22–30.

Renkl, A. 1997. Learning from worked-out examples: A study on individual differences. *Cognitive Science* 21 (1): 1–29.

———, R. Stark, H. Gruber, and H. Mandl. 1998. Learning from worked-out examples: The effects of example variability and elicited self-explanations. *Contemporary Educational Psychology* 23: 90–108.

———. 1999. Learning mathematics from worked-out examples: Analyzing and fostering self-explanations. *European Journal of Psychology of Education* 14 (4): 477–488.

Suedfeld, P., P. E. Tetlock, and S. Streufert. 1992. Conceptual/integrative complexity. In *Motivation and Personality: Handbook of Thematic Content Analysis*, edited by C. P. Smith. New York, NY: Cambridge University Press.

Sweller, J., and G. A. Cooper. 1985. The use of worked examples as a substitute for problem solving in learning algebra. *Cognition and Instruction* 2 (1): 59–89.

Tan, H. T. 1995. Effects of expectations, prior involvement, and review awareness on memory for audit evidence and judgment. *Journal of Accounting Research* 33 (1): 113–135.

Tetlock, P. E. 1985. Accountability: The neglected social context of judgment and choice. In *Research in Organizational Behavior*, Vol. 7, edited by B. M. Staw, and L. Cummings. Greenwich, CT: JAI Press.

VanLehn, K. 1996. Cognitive skill acquisition. In *Annual Review of Psychology*, edited by J. Spence, J. Darly, and D. J. Foss. Palo Alto, CA: Annual Reviews.

Voss, J. 1987. Learning and transfer in subject-matter learning: A problem-solving model. *International Journal of Educational Research* 11 (6): 607–622.

Webb, N. M. 1980. A process-outcome analysis of learning in group and individual settings. *Educational Psychology* 15 (2): 69–83.

Zhu, X., and H. A. Simon. 1987. Learning mathematics from examples and by doing. *Cognition and Instruction* 4 (3): 137–166.

THE ACCOUNTING REVIEW
Vol. 76, No. 1
January 2001
pp. 99–110

Do Auditors Objectively Evaluate Their Subordinates' Work?

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ABSTRACT: In this study, we investigate whether audit managers' assessment of the quality of work their subordinates perform is influenced by the managers' prior impressions of these subordinates, and whether managers whom the firm considers outstanding are less susceptible to such an effect. We conduct an experiment using actual audit senior-manager teams. Each senior and manager participating in the experiment has been classified by his or her firm as either outstanding or average. Each manager is paired with two audit seniors (one outstanding senior and one average senior), and each evaluates the memos written by his or her paired seniors. Managers evaluate the quality of the memos twice: (1) first, with the identities of the seniors indicated on the memos, and (2) later, when the seniors' identities are not explicitly revealed. Results show that average managers evaluate memos written by outstanding seniors more favorably than those written by average seniors when they know the identities of the memos' authors, but not when the identities of the seniors are not revealed. Outstanding managers do not appear susceptible to this effect.

Key Words: *Review process, Perceived competence, Performance evaluation, Auditor expertise.*

Data Availability: *Please contact the first author.*

I. INTRODUCTION

The audit review process helps public accounting firms control quality (AICPA 1999), and it also provides information for performance appraisal of, and timely feedback to, subordinates. Reviewers must objectively assess their subordinates' work for the review process to achieve these objectives.

We thank Nick Dopuch, Michael Gibbins, Bobby Mak, Terence Ng, Premila Gowri Shankar, Ira Solomon, and the anonymous referee for insightful comments, and the two Big 5 firms for participating in the study.

Submitted December 1999
Accepted June 2000

In this paper, we investigate whether audit managers' assessment of the quality of their subordinates' work depends on their prior impressions of these subordinates. We also investigate whether managers whom the firm considers outstanding (based on their overall performance ratings) are less susceptible to any such effect. Audit managers (reviewers) frequently work with a regular group of audit seniors (preparers), so the managers become familiar with the subordinates whose performance they must assess. This familiarity with subordinates can enhance the efficiency and effectiveness of the review process. For example, Asare and McDaniel (1996) conclude that auditors who review the work of a familiar preparer re-perform less of the preparer's work and detect more conclusion errors, relative to reviewers of an unfamiliar preparer. However, a reviewer's general impression formed from prior interactions may impair the reviewer's ability to objectively assess the preparer's work (e.g., Longenecker et al. 1987). Our study provides empirical evidence on this issue.

Reviewers' ability to objectively evaluate preparers' work is important for several reasons. First, inability to objectively evaluate the quality of preparers' work limits the extent to which the audit review process is an effective quality-control mechanism. The review process has been associated with process gains such as enhanced attention to inconsistent evidence (Libby and Trotman 1993), as well as the detection of conclusion and documentation errors (Ramsay 1994). Such gains may be attenuated if reviewers are more influenced by their prior impressions of the preparers than by the actual quality of the workpapers submitted for review. For example, reviewers who over-rely on the work of a preparer perceived to be competent may become less vigilant in finding inconsistencies and let errors go undetected, thereby impairing audit effectiveness. Reviewers who under-rely on the work of a preparer perceived to be less competent may spend excessive time scrutinizing or re-performing the preparer's work, impairing audit efficiency. Second, the precision and accuracy of the feedback provided by the review process hinge on the evaluations' objectivity. If reviewers systematically accord better evaluations to preparers based on general impressions from prior interactions (as opposed to the actual quality of work done on the specific assignment), then the quality of the feedback on specific assignments is impaired. The learning environment may become more impoverished, and related errors in promotion decisions can also occur. Third, if a reviewer's *ex ante* impression of a preparer does influence the reviewer's assessment of the preparer's current work, impression management and self-enhancement activities are likely to affect an auditor's career (Emby and Gibbins 1988; Rich et al. 1997; Tan and Libby 1997).

We conduct an experiment in which we assess audit managers' ability to objectively evaluate the quality of preparers' work. Our experiment matches each audit manager with two audit seniors with whom the audit manager is familiar. The firm's performance evaluation system rates one of the seniors as outstanding, and the other as average. The firm has also classified the audit managers as either outstanding or average. These managers evaluate the quality of justification memos written by their assigned seniors. The managers provide two evaluations: (1) when the identities of the seniors are revealed, and (2) three weeks later, when the identities of the seniors are not explicitly revealed.

We find that average audit managers accord better evaluations to memos written by outstanding seniors than to those written by average seniors—*but only when the managers know the seniors' identities*. This result is consistent with auditors assessing the quality of their subordinates' work at least partially based on the perceived competence of these subordinates, and not exclusively by the quality of the specific piece of work under review. We also provide evidence that outstanding managers are less susceptible to this effect.

Our inferences are based on an experiment that captures important environmental features of the audit review process that prior studies have not captured. For example, in prior research on the review process, the preparers are hypothetical (see Philips [1999] for a recent example), anonymous (see Trotman 1985), or possibly unfamiliar to the reviewer (Solomon 1982). In practice, however, reviewers do know who prepared the workpapers submitted for review, and reviewers at the manager level are usually familiar with the seniors on the audit team. In addition, given that managers play a major role in the subordinates' performance evaluation, managers are also likely to be aware of the overall performance ratings of the subordinates with whom they work.[1] Our experimental design captures these elements by: (1) limiting participants to audit-team members who generally work with each other in a natural setting, and (2) assessing whether audit managers' knowledge of the preparers' identities affects their evaluations of the quality of the preparers' work. Our evidence suggests that benefits of the review process documented in prior studies may depend on whether reviewers are influenced by their awareness of the identities (and relative standings) of the workpaper preparers. We believe that this study provides the first empirical demonstration that the ability to objectively assess subordinates' work is another dimension of auditor expertise.

The remainder of the paper is organized as follows. Section II discusses the previous literature and develops our hypotheses. Section III describes the experiment. Section IV presents the results. Section V summarizes the findings and comments on the study's implications.

II. HYPOTHESIS DEVELOPMENT

In practice, reviewers typically know who prepared the workpapers submitted for review. However, prior research has seldom captured this feature. For example, in many studies on the process gains stemming from the review process, the workpaper preparers are hypothetical because researchers prepared the experimental materials (e.g., Libby and Trotman 1993; Ramsay 1994).

Other studies on the audit review process do employ actual (rather than hypothetical) preparers (e.g., Solomon 1982; Trotman 1985; Ismail and Trotman 1995). In some of these studies, the reviewers do not know the preparers' identities (e.g., Trotman 1985); in others, the subjects are selected based on availability rather than on prior interactions, and it is unclear how familiar the reviewers are with the preparers (e.g., Solomon 1982; Ismail and Trotman 1995).

Two studies investigate the effects of subjects' familiarity with the preparers' competence. Bamber (1983) manipulates reviewers' perceptions of preparer reliability by informing the reviewers of hypothetical preparers' levels of reliability, then asking the reviewers to assess the likelihood that the preparers' conclusions about the internal control system are true. The results show that reviewers do discount information from less reliable preparers. Asare and McDaniel (1996) manipulate subjects' familiarity with the preparer by describing the preparer as someone the reviewer either knows or does not know from prior engagements. They find that reviewers, when informed of their familiarity with hypothetical preparers, have more confidence in and re-perform less of the familiar preparer's work. However, prior research has not addressed whether reviewers incorporate into the review process their general impressions of *actual* preparers with whom they are familiar.

Applying findings on the "halo effect" documented in the psychology literature (Cooper 1981; Bernardin and Beatty 1984; Murphy et al. 1993) to the audit review context, we suggest that reviewers who know the workpaper preparers' identities may assess the quality of the workpaper based on past impressions. Pressures in the work environment make it difficult for a rater to monitor the actual work of all of his or her subordinates (Cooper 1981). The rater observes small samples of each subordinate's behavior and, over time, forms a general impression of each individual. In subsequent performance appraisals, the rater relies heavily on this prior general impression rather than on the more cognitively demanding task of attending to and monitoring the subordinate's work. This suggests that reviewers may form initial impressions based on inadequate samplings of ratee behavior, and that these general impressions, once formed, may be resistant to change. The halo effect may thus undermine the rater's ability to assess objectively the strengths and weaknesses of a ratee's performance on a specific task (Nathan and Lord 1983).

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[1] One of the participating firms conducts annual evaluation sessions where managers meet as a group to jointly discuss and determine the performance evaluations of their subordinates.

Underlying the halo effect are the psychological processes of impression formation and confirmation bias that make the process of performance appraisal liable to self-fulfilling prophecies (Darley and Fazio 1980; Balzer 1986). A superior's initial impression of a subordinate creates expectations and leads to selective encoding and interpretation of that subordinate's subsequent performance—an interpretation consistent with what the superior had expected (Johnson and Judd 1983). Initial impressions can also serve as retrieval cues, increasing the likelihood that the superior selectively recalls information (Snyder and Uranowitz 1978). Furthermore, the superior may interpret as positive a particular behavior from an employee labeled as "good," whereas the superior may interpret that same behavior far more negatively if the employee is labeled as "poor" (Balzer 1986; Martell and Willis 1993).

These findings suggest that when audit managers review seniors' work in a natural setting, knowledge of those seniors' identities (and of their relative performance rankings) is likely to influence the managers' evaluations. Specifically, we predict that when managers know the seniors' identities, the manager will evaluate work performed by seniors deemed to be outstanding (per the firm's performance evaluation system) more favorably than they will the very same quality work performed by those seniors deemed average; we expect this differential evaluation to be smaller when the managers do not know the seniors' identities. Our hypothesis is formally expressed as follows:

> **H1:** The extent to which an audit manager rates the work of an outstanding senior more highly than that of an average senior will be greater when the seniors' identities are known than when they are not known.

Tacit managerial knowledge has three components: knowing how to manage oneself, knowing how to manage others, and knowing how to manage a career (Wagner and Sternberg 1985; Tan and Libby 1997). Knowing how to manage others includes knowing how to manage one's subordinates and monitor their work. Thus, auditors with greater tacit managerial knowledge should be better able to assess their subordinates' work objectively, provided they possess the requisite technical knowledge. Prior research has shown that outstanding managers (according to their firms' performance evaluation systems) have better tacit managerial knowledge than do average managers, and that managers (both outstanding and average) possess relatively high levels of general technical knowledge (Tan and Libby 1997). Given their lower tacit managerial knowledge, average managers may be more likely (than outstanding managers) to rely on seniors' performance evaluation as a cue on the quality of their subordinates' work, rather than objectively assessing the actual quality of the work. This suggests that outstanding managers are more likely than are average managers to assess the work of their subordinates objectively:

H2: Knowledge of seniors' identities will have more impact on average managers' than outstanding managers' evaluations of the seniors' work.

III. RESEARCH METHOD

Subjects

Our subjects consist of 40 audit seniors (mean experience = 37 months) and 20 audit managers (mean experience = 98 months) from two Big 5 firms. Seventy percent of the subjects come from Firm 1, and 30 percent from Firm 2. Each auditor participating in this study is selected by either a training manager working under the guidance of the staff partner (for Firm 1) or by a senior partner (for Firm 2). Subjects meet two criteria: (1) each manager is paired with seniors with whom he or she normally works, and (2) one of these seniors is considered to be outstanding, and the other is considered to be average, according to the firm's performance evaluation system. The managers are also classified as either outstanding or average.[2] On average, outstanding and average managers have 109 months and 88 months of experience, respectively ($F = 1.10$, $p = 0.308$). Outstanding and average seniors have 43 and 31 months of experience, respectively ($t = 3.55$, $p = 0.001$).

Procedure

The experiment consists of two major parts. In the first part, the audit seniors write memos to their paired managers. Specifically, the audit seniors are informed of the name of the specific manager with whom they have been paired. Each senior reads a description of a case (see discussion of case material in the next section), and then writes a memo to his or her paired manager on the key issues of which the manager should be aware.[3]

The second part of the experiment involves the audit managers, and comprises two stages. In Stage 1, the managers assess memos handwritten by their paired seniors. We provide the handwritten memos as evidence that they are written by the specific paired seniors—assuming that the managers are likely to recognize the handwriting of their paired seniors. Each preparer's identity appears on the corresponding memo, but the memo does not indicate whether its preparer is an outstanding or an average senior.[4] Managers evaluate the two memos on a separate sheet bearing two 11-point scales, one scale for each memo. Each scale ranges from 0 (very poor memo) to 10 (extremely good memo). The managers are assured that their ratings of the memos will be confidential, and not revealed to the seniors. As a control, one of the authors personally administered the instrument to each manager.

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[2] Partners consider that auditors classified as "average" make a positive contribution to the firm (i.e., their performance ratings are still satisfactory). The firms use a five-point evaluation scale (1 = unacceptable; 2 = below average; 3 = average; 4 = above average; 5 = outstanding). At the date of the experiment, none of the participating auditors had received a rating of "below average" or lower.

[3] As part of an unrelated study, before performing the memo task, subjects from Firm 1 also predict the choices made by other auditors on various audit and accounting tasks. The current study's inferences continue to hold after statistically controlling for these other choices or predictions. Moreover, these other choices or predictions do not moderate the results reported in this paper ($p > 0.295$).

[4] Subjects are not aware of the basis upon which they have been selected to participate in this study, because of the confidential and sensitive nature of the performance ratings. As a result, we do not ask the managers in Firm 1 (from which the majority of our subjects come) to rank their paired seniors by overall performance ratings. The firm assured us that the managers are aware of the performance ratings of their paired seniors because these managers work frequently with the seniors and evaluate their performance. To directly assess whether managers are aware of the relative performance ratings of their assigned seniors, we ask the Firm 2 managers, after they have evaluated the memos, to identify which of their two assigned seniors is more outstanding based on prior performance. All the managers successfully identified the more outstanding senior, and all mentioned that they were aware of the seniors' performance ratings.

Stage 2 is conducted about three weeks later so that the managers' memories of the grades they had assigned to the seniors will be cleared.[5] Each manager again evaluates the quality of memos written by the same two seniors they evaluated in Stage 1. This time, the memos are typewritten, and we removed each senior's identification. We also randomized the order in which managers read the memos.[6]

Two features of our experiment should be noted. First, the manager grades each senior's memo twice, once when the identity of the memo's preparer is disclosed, and once when it is not disclosed. This within-subject design holds constant individual differences in rating leniency. Second, the participating firm formed teams in which each manager has about the same experience working with each of the two assigned seniors. This reduces the likelihood that differences in evaluations are due to differences in the managers' familiarity with the outstanding and average seniors.

Case Material

The case upon which the memos are written is adapted from Hackenbrack and Nelson (1996) and involves a long-standing audit client that produces soundcards for personal computers. An aging analysis suggests that part of the accounts receivable is overdue, but that the part of accounts receivable in question concerns a new product for which there is no history. The additional provision in question is not material to the client's assets, but can result in the client violating its debt covenants because current profits are low. The client is willing to make a footnote disclosure about the slow cash collection, but does not want to make an accrual for an additional allowance. The audit seniors participating in our study each write a memo to their audit managers regarding whether to insist on an additional allowance for doubtful accounts, or to accede to the client's request.

IV. ANALYSIS AND RESULTS

Tests of Subjects' Familiarity

We assess subjects' familiarity with their matched partners in two ways. First, we ask subjects to rate, on an 11-point scale, the degree to which they know the working styles and preferences of their paired managers or seniors (0 = extremely unfamiliar; 10 = extremely familiar). The ratings by seniors and managers are 6.20 and 6.40, respectively. Second, we ask subjects to indicate the percentage and length of their time spent working with their matched partners. Seniors and managers report spending an average of 40 percent and 19 percent of their time working with each other, respectively; this amounts to about 21 months of interaction. We find no significant differences in familiarity ratings and interaction time between outstanding and average managers (smallest $p > 0.510$), or between outstanding and average seniors (smallest $p > 0.494$). We also find no difference in the experience level of seniors assigned to the outstanding and average managers (mean experience = 38 and 36 months, respectively; F = 0.38, p = 0.543).

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[5] Certain features of the experiment reduce the impact of any discussion between managers and seniors that takes place between Stages 1 and 2. First, seniors write the memos under supervised conditions and return the memos to the researchers immediately after completion, so they do not have copies of their own memos. Second, managers evaluate the memos under equally controlled conditions; the memos are returned to the researchers after evaluation; at Stage 1 the managers are unaware they will be asked to evaluate the memos a second time. This reduces the likelihood that they will attempt to record the content of the memos or their evaluations, or to talk to the seniors to learn about the memos.

[6] The handwritten memos with seniors' identification in Stage 1 preserve the natural setting under which managers operate, and avoid potential demand effects. Had we removed the seniors' identification and typed the memos in Stage 1, this may have alerted managers to the issue we are investigating and led to unintended demand effects in Stage 2. In addition, we maintain a three-week interval between the Stage 1 and Stage 2 evaluations, and at Stage 1 we do not inform managers that they will be making a second evaluation.

Main Results

Outstanding vs. Average Senior's Memo Ratings

To assess managers' ratings of the outstanding senior's work *relative* to the average senior's work, we compute "Diffrating," defined as $\text{Rating}_{\text{outstanding senior}} - \text{Rating}_{\text{average senior}}$. This pairwise difference reflects the fact that the same manager rates both the outstanding senior and the average senior, thereby controlling for individual differences in evaluations. A positive Diffrating measure means that audit managers rate outstanding seniors higher than average seniors, and conversely.

Descriptive statistics appear in Table 1. To test our hypotheses, we conduct a mixed ANOVA with Stage (Stage 1, Stage 2) as a repeated measure, and Manager Rank (outstanding, average) as a between-subject factor (see Table 2).

Hypothesis 1 predicts that knowledge of the seniors' identities will lead managers to assign systematically higher (lower) ratings to the work performed by outstanding (average) seniors. This suggests that Diffrating will be higher in Stage 1 (when managers know the seniors' identities) than in Stage 2 (when the seniors' identities are not disclosed). Consistent with H1, Table 1 shows that Diffrating is higher in Stage 1 than in Stage 2 (means = 1.02 and −0.27, respectively), and Table 2 shows that the main effect of Stage is statistically significant at p = 0.012 (F = 6.06).[7]

Hypothesis 2 predicts that this difference in ratings received by outstanding and average seniors across Stages 1 and 2 will be greater for the average managers than for the outstanding managers. Consistent with this hypothesis, Table 2 shows that the two-way interaction between Stage and Manager Rank is significant at p = 0.021 (F = 4.82). The main effect of Manager Rank is not statistically significant (F = 0.01, p = 0.913).

Given the significant Stage × Manager Rank interaction, we next separately analyze Diffrating (across Stage 1 and Stage 2) for average and then for outstanding managers. For average managers, Diffrating is significantly higher in Stage 1 (mean = 1.55) than in Stage 2 (mean = −0.90; difference in means = 2.45, F = 10.34, p = 0.006). Thus, when all the memo authors' identifies are known, average managers rate the memos written by outstanding seniors more highly than memos written by average seniors—but not when the seniors' identifies are not disclosed. By contrast, outstanding managers' Diffrating does not differ significantly across Stages 1 and 2 (mean = 0.50 and 0.36 in Stages 1 and 2, respectively; difference in means = 0.14, F = 0.04, p = 0.851). Therefore, outstanding managers objectively evaluate the work performed by both outstanding and average seniors, and are not significantly influenced by the seniors' identities.[8]

As a further analysis, we conduct a mixed ANOVA with Stage 1 and Stage 2 ratings for outstanding seniors as a within-subject variable, and Manager Rank as a between-subject variable. Results show a significant two-way interaction (F = 10.01, p = 0.005), a marginally significant main effect of Stage (F = 4.20, p = 0.055), and no significant main effect of Manager Rank (F = 0.03, p = 0.868). Average managers accord higher ratings to the

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[7] All directional tests are one-tailed tests.

[8] To assess any effects of firm affiliation, we include subjects' firm affiliation (Firm) as a dummy variable in our hypotheses tests. Firm does not significantly interact with the independent variables (smallest p = 0.324), and our results are unchanged by the inclusion of the Firm variable. We also re-analyze our results using the Wilcoxon signed-rank test, which yields identical inferences for H1 (p = 0.011) and H2 (p = 0.009 and 0.573 for tests related to average and outstanding managers, respectively).

TABLE 1
Managers' Ratings of Memos Written by Seniors[a]

		Ratings for Outstanding Seniors' Memos	*Ratings for Average Seniors' Memos*	*Test of Difference in Diffrating (Ratings for Outstanding Seniors Minus Ratings for Average Seniors' Memos)*
Panel A: All Managers (n = 20)				
Stage 1 (seniors' identities known)	Mean	6.45	5.43	1.02**
	Std. Deviation	1.73	1.70	2.08
	Range	3 to 9	1 to 7	−3 to 7
Stage 2 (seniors' identities unknown)	Mean	5.61	5.88	−0.27
	Std. Deviation	1.79	2.01	2.75
	Range	3 to 9	2 to 9	−4 to 6
Test of difference in ratings between stages (Stage 1 ratings minus Stage 2 ratings)	Mean	0.84*	−0.45	1.29**
	Std. Deviation	2.24	1.88	2.58
	Range	−4 to 4	−4 to 3	−5 to 6
Panel B: Average Managers (n = 10)				
Stage 1 (seniors' identity known)	Mean	7.05	5.50	1.55**
	Std. Deviation	1.74	1.51	2.54
	Range	3 to 9	2 to 7	−3 to 7
Stage 2 (seniors' identity unknown)	Mean	4.90	5.80	−0.90
	Std. Deviation	1.60	2.30	2.33
	Range	3 to 8	2 to 9	−4 to 2
Difference in ratings between Stages 1 and 2	Mean	2.15***	−0.30	2.45**
	Std. Deviation	1.67	2.11	2.41
	Range	−1 to 4	−4 to 3	0 to 6
Panel C: Outstanding Managers (n = 10)				
Stage 1 (seniors' identity known)	Mean	5.85	5.35	0.50
	Std. Deviation	1.56	1.94	1.43
	Range	4 to 8	1 to 7	−2 to 3
Stage 2 (seniors' identity unknown)	Mean	6.31	5.95	0.36
	Std. Deviation	1.77	1.80	3.10
	Range	4 to 9	3 to 8	−4 to 6
Difference in ratings between Stages 1 and 2	Mean	−0.46	−0.60	0.14
	Std. Deviation	2.01	1.71	2.29
	Range	−4 to 3	−4 to 2	−5 to 3

(*Continued on next page*)

TABLE 1 (Continued)

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* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.001$.

[a] Each manager is paired with two seniors (one outstanding and one average), and rates the memos written by each senior twice: once when the identity of the memo's preparer is disclosed, and again when the identity of the memo's preparer is not disclosed. The rating scale ranges from 0 (very poor memo) to 10 (extremely good memo). Seniors and managers are classified as outstanding or average based on their firm's performance evaluation ratings.

work by the outstanding seniors when the managers know the seniors' identities than when they do not (F = 16.62, p = 0.003). In contrast, outstanding managers' ratings of outstanding seniors' memos are not significantly different across Stage 1 and Stage 2 (F = 0.53, p = 0.487). We repeat the previous analysis using Stage 1 and Stage 2 ratings for average seniors, and find no significant main or interaction effects ($p > 0.309$), indicating that the managers (both outstanding and average) do not rate the average seniors any differently in Stages 1 and 2. This set of results suggests that the average managers are influenced by knowledge of the outstanding seniors' identities, while outstanding managers are not.

To assess whether the memos evaluated by the outstanding managers are systematically different from those evaluated by the average managers, we ask audit partners to assess the memos written by the seniors. These memos are typewritten and do not identify their authors. For Firm 1, four partners assess the seniors' memos, and we use the median ratings among the four partners for each senior in the following analysis. For Firm 2, only the

TABLE 2
ANOVA Results on the Effects of Manager Rank and Evaluation Stage on Managers' Ratings of Memos Written by Outstanding and Average Seniors (Diffrating)[a]

Source	*Sum of Squares*	*df*	*Mean Square*	*F-statistic*	*p-value*
Between-Subjects					
Manager Rank[b]	0.11	1	0.11	0.01	0.913
Error	162.30	18	9.02		
Within-Subjects					
Stage[c]	16.77	1	16.77	6.06	0.012
Stage × Manager Rank	13.34	1	13.34	4.82	0.021
Error (Stage)	49.80	18	2.77		

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[a] Diffrating is defined as each manager's rating of the memo written by the outstanding senior minus his or her rating of the memo written by the average senior. Managers' ratings are made on a scale that ranges from 0 (very poor memo) to 10 (extremely good memo). Seniors are classified as outstanding or average based on their firm's performance evaluation ratings.

[b] Managers are classified as outstanding or average based on their firm's performance evaluation ratings.

[c] Managers rate the memos written by each senior twice: in Stage 1 when the identity of the memo's preparer is disclosed, and again in Stage 2 when the identity of the memo's preparer is not disclosed.

technical partner assesses the seniors' memos. Using the partners' ratings, we compute a measure, $\text{Partner Rating}_{\text{outstanding senior}} - \text{Partner Rating}_{\text{average senior}}$, for each pair of seniors assigned to each manager, and find no significant difference attributable to Manager Rank (mean $= -0.50$ for both outstanding and average managers; $t = 0.00$, $p = 1.000$). Among the memos assessed by the average managers, the mean partner ratings for the memos written by outstanding and average seniors are not statistically different (means = 4.75 and 5.25, respectively; paired t-test = 0.85, $p = 0.416$); neither are they different for the memos assessed by the outstanding managers (means = 4.67 and 5.17, respectively; paired t-test = 0.56, $p = 0.593$).[9] These partner ratings indicate that there is no difference in the quality of memos evaluated by outstanding and average managers.[10] This enhances our confidence in the inference that average managers—but not the outstanding managers—become less objective when they know the seniors' identities.

V. CONCLUSIONS

This study investigates whether audit managers objectively evaluate memos written by their subordinates. As predicted, we find that when average managers are aware of the seniors' identities, the managers evaluate memos written by outstanding seniors more favorably than they do those written by average seniors. However, this does not occur when the authors' identities are not disclosed. That the same managers make the evaluations in both instances (with and without knowledge of the seniors' identities) suggests that the higher evaluation of outstanding seniors is due to the managers' knowledge of the seniors' identities and not to superior performance of the outstanding seniors on the specific task at hand. By contrast, outstanding managers' ratings do not depend on their knowledge of the seniors' identities. Thus, the ability to evaluate the work of subordinates objectively is an attribute of auditor expertise.

Prior research suggests that it may be important for audit seniors to undertake justification and self-promotion to manage the perceptions of their managers (e.g., Emby and Gibbins 1985; Rich et al. 1997). The results in this study imply that, to the extent that managers have formed a favorable impression of a subordinate (either through the management of managers' impressions or through actual good performance), the subordinate's subsequent behaviors may be interpreted more favorably. Our results also suggest that reviewers (specifically, average managers) may anchor their evaluations on knowledge of the preparers' prior performance. This strategy has merit from a Bayesian perspective, in that "better" (prior overall) performers are more likely to perform well in the future. However, there are disadvantages for the quality both of feedback and of performance evaluation. Providing assessments solely on the basis of prior performance may lead to inaccurate feedback, which limits subordinates' ability to learn from the feedback. The limitation of using past performance as an indicator of future performance is accentuated when subordinates perform tasks that require different skills than those currently employed (see Libby and Tan 1994; Tan and Kao 1999).

Some environmental features in public accounting firms may mitigate these concerns. First, audit seniors generally work with different managers on different assignments, and they should, over time and across assignments, benefit from receiving feedback and performance evaluations from different managers. Second, in some public accounting firms

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[9] We obtain similar results using the mean (rather than median) partners' ratings of each senior ($p > 0.276$), or if we use the Wilcoxon signed-rank test ($p > 0.610$).

[10] The ambiguous nature of the bad-debt-allowance task may explain why no difference is found in the memo quality of the outstanding and average seniors. Specifically, this task does not have a right or wrong answer, so seniors can use a variety of reasons to justify their stand.

(see footnote 1), annual performance evaluations are shared among managers, or made in a group setting. This suggests that average managers can benefit from learning about subordinates' performance evaluations that are made by other managers (particularly the outstanding ones). Moreover, the overall group evaluation of a subordinate's performance should incorporate outstanding managers' opinions (which are relatively more objective).

One limitation of our study is the small sample size. This limitation results from two conditions imposed by our research design: (1) auditors must have worked with each other for a significant period, and (2) audit managers and seniors must be ranked high or low based on their firm's performance evaluation. These criteria constrain the number of subjects available. Our paper also does not directly address how knowledge of subordinates' identities moderates process gains arising from the review process. This is an important question for future research. In addition, our study focuses on managers' assessment of seniors' work, not on how partners or seniors assess the work done by auditors at other ranks (i.e., we cannot rule out that the effects here may be specific to the manager-senior ranks).

Another limitation of our study is that the outstanding seniors are also more experienced than the average seniors. Thus, average managers' higher ratings of outstanding seniors' work may be due either to the perceived competence of the outstanding seniors, to the greater experience of these seniors, or to both attributes. Our debriefing with the six managers from Firm 2 provides some evidence on this issue. We find that all of these managers know the relative performance ratings of their paired seniors. Moreover, when asked to explain why one senior is better than is the other, the majority indicate technical competence (five managers) and the ability to see a "big picture" (four managers) as key attributes of the more outstanding senior. Only two managers mention experience as an attribute, and none mention experience to the exclusion of other attributes. This provides some evidence that experience is unlikely to be the only or most important cue. Future research can attempt to partition the differential impact of a preparer's experience level and perceived competence level on reviewers' assessments.

Effects of awareness of subordinates' prior performance documented in this experiment are likely to be more pronounced in field settings. In such settings, time pressure, delays between task performance and performance evaluation, and the lack of objective criteria in assessing performance may exacerbate the effects reported here. Future research can examine mechanisms that may improve auditors' objectivity in evaluating their subordinates' work. Instruction and training may attenuate such biases (see Thornton and Zorich 1980), but this question awaits empirical investigation.

REFERENCES

American Institute of Certified Public Accountants (AICPA). 1999. *Professional Standards, Vol. 1.* New York, NY: AICPA.

Asare, S. K., and L. S. McDaniel. 1996. The effect of familiarity with the preparer and task complexity on the effectiveness of the audit review process. *The Accounting Review* 71 (April): 139–159.

Balzer, W. K. 1986. Biases in the recording of performance-related information: The effects of initial impression and centrality of the appraisal task. *Organizational Behavior and Human Decision Processes* 37 (June): 329–347.

Bamber, E. M. 1983. Expert judgment in the audit team: A source reliability approach. *Journal of Accounting Research* (Autumn): 396–412.

Bernardin, H. J., and R. W. Beatty. 1984. *Performance Appraisal: Assessing Human Behavior at Work.* Boston, MA: Kent.

Cooper, W. 1981. Ubiquitous halo. *Psychological Bulletin* 90 (September): 218–244.

Darley, J., and F. Fazio. 1980. Expectancy confirmation processes arising in the social interaction sequence. *American Psychologist* 35 (October): 867–881.

Emby, C., and M. Gibbins. 1988. Good judgment in public accounting: Quality and justification. *Contemporary Accounting Research* (Spring): 287–313.

Hackenbrack, K., and M. Nelson. 1996. The relation between auditors' incentives and their application of financial accounting standards. *The Accounting Review* 71 (January): 43–60.

Ismail, Z., and K. Trotman. 1995. The impact of the review process in hypothesis generation task. *Accounting, Organizations and Society* 20 (July): 345–357.

Johnson, J. T., and C. M. Judd. 1983. Overlooking the incongruent: Categorization biases in the identification of political statements. *Journal of Personality and Social Psychology* 45 (November): 978–996.

Libby, R., and H-T. Tan. 1994. Modeling the determinants of audit expertise. *Accounting, Organizations and Society* 19 (November): 701–716.

———, and K. T. Trotman. 1993. The review process as a control for differential recall of evidence in auditors' judgments. *Accounting, Organizations and Society* 18 (August): 559–574.

Longenecker, C. O., H. P. Sims, and D. A. Gioia. 1987. Behind the mask: The politics of employee appraisal. *Academy of Management Executive* 1 (August): 183–193.

Martell, R. F., and C. E. Willis. 1993. Effects of observers' performance expectations on behavior ratings of work groups: Memory or response bias? *Organizational Behavior and Human Decision Processes* 56 (October): 91–109.

Murphy, K., R. A. Jako, and R. L. Anhalt. 1993. Nature and consequences of halo error: A critical analysis. *Journal of Applied Psychology* 78 (April): 218–225.

Nathan, B. R., and R. G. Lord. 1983. Cognitive categorization and dimensional schemata: A process approach to the study of halo in performance ratings. *Journal of Applied Psychology* 68 (February): 102–114.

Philips, F. 1999. Auditor attention to and judgments of aggressive financial reporting. *Journal of Accounting Research* 37 (Spring): 167–189.

Ramsay, R. 1994. Senior/manager differences in audit workpaper review performances. *Journal of Accounting Research* 32 (Spring): 127–135.

Rich, J. S., I. Solomon, and K. T. Trotman. 1997. The audit review process: A characterization from the persuasion perspective. *Accounting, Organizations and Society* (May): 481–505.

Snyder, M., and S. W. Uranowitz. 1978. Reconstructing the past: Some cognitive consequences of person perception. *Journal of Personality and Social Psychology* 36 (September): 941–950.

Solomon, I. 1982. Probability assessments by individual auditors and audit teams: An empirical investigation. *Journal of Accounting Research* 20 (Autumn): 689–710.

Tan, H-T., and A. Kao. 1999. Accountability effects on auditors' performance: The influence of knowledge, problem-solving ability, and task complexity. *Journal of Accounting Research* 37 (Spring): 209–223.

———, and R. Libby. 1997. Tacit managerial versus technical knowledge as determinants of audit expertise in the field. *Journal of Accounting Research* 35 (Spring): 97–113.

Thornton, G. C., and S. Zorich. 1980. Training to improve observers' accuracy. *Journal of Applied Psychology* 65 (June): 351–354.

Trotman, K. 1985. The review process and the accuracy of auditor judgments. *Journal of Accounting Research* 23 (Autumn): 740–752.

Wagner, R. K., and R. J. Sternberg. 1985. Practical intelligence in real-world pursuits: The role of tacit knowledge. *Journal of Personality and Social Psychology* (August): 436–458.

THE ACCOUNTING REVIEW
Vol. 76, No. 1
January 2001
pp. 111–126

The Association between Auditor Litigation and Abnormal Accruals

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ABSTRACT: Concern that earnings management erodes the quality of financial reporting has prompted the Securities and Exchange Commission to question the role of the external auditor. To help address that concern, this study examines the relation between earnings management and auditor litigation. While prior research on the relation between auditor litigation and *total accruals* has yielded inconclusive results, I find that the risk of auditor litigation is positively associated with a sharper measure of earnings management—*abnormal accruals*. Using a larger and more recent sample, this study provides evidence that the probability of auditor litigation increases as clients report more positive (income-increasing) abnormal accruals. This result holds in: (1) univariate analyses, (2) logit analyses that also control for auditor size, client importance to the auditor, length of the auditor-client relationship, client industry, client financial condition, client size, and client growth, and in (3) the subsample of lawsuits alleging wrongdoing in the more recent time period (1984–1998).

Key Words: *Auditor litigation, Earnings management, Abnormal accruals.*

Data Availability: *A list of sample firms is available from the author. The data used in the study can be obtained from public sources.*

I. INTRODUCTION

The financial press and regulators have recently expressed considerable concern about earnings management. Academic research and the business press report a widespread belief that managers commonly engage in earnings management that obscures the firm's intrinsic value (e.g., Bruns and Merchant 1990; Rosenzweig and Fischer 1994; Fox 1997; Loomis 1999; Dechow and Skinner 2000). In fact, Arthur Levitt, Chairman

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This paper is based on my dissertation completed at the University of Georgia. I thank the members of my dissertation committee, Michael Bamber, Paul Copley, Jennifer Gaver, Kenneth Gaver, and Carl Warren for their valuable help and suggestions. I also sincerely appreciate the comments and suggestions from Russell Barefield, Dennis Beresford, Theodore Christensen, Zoe-Vonna Palmrose, Jeffrey Paterson, Evelyn Patterson, Elizabeth Plummer, Reed Smith, two anonymous reviewers, and workshop participants at Case Western Reserve University, Florida State University, the University of Georgia, the University of Missouri–Columbia, SUNY at Buffalo, and the 1997 AAA Annual Meeting. I am also grateful to Vincent O'Brien for allowing access to firm names included in his security litigation study.

Submitted January 2000
Accepted September 2000

of the Securities and Exchange Commission (SEC), has made earnings management a top priority, calling it "a game among market participants" and charging that it is creating an "erosion in the quality of earnings, and therefore, the quality of financial reporting" (Levitt 1998, 1).

Schipper (1989) explains that earnings management is "a direct intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process)."[1] Managers have many incentives to manage earnings, including compensation (Healy 1985; Pourciau 1993; Gaver et al. 1995; Holthausen et al. 1995), avoiding debt-covenant violation (Press and Weintrop 1990; Beneish and Press 1993; Smith 1993; Sweeney 1994; DeFond and Jiambalvo 1994), meeting and beating earnings benchmarks (Burgstahler and Dichev 1997; Barth et al. 1999; Brown and Higgins 2000), and reducing regulatory or political costs (Jones 1991; Key 1997; Han and Wang 1998).[2] In general, however, managers prefer higher, rather than lower, reported earnings. This preference conflicts with the interests of other stakeholders who prefer timely indication of potential problems.

External stakeholders expect the independent auditor to limit earnings management and, more generally, ensure fair financial reporting. Thus, stakeholders are more likely to sue the auditor if they perceive a failure in financial reporting (Palmrose 1987, 1988; Stice 1991; Francis et al. 1994a; Lys and Watts 1994).[3] The Public Oversight Board (POB) explains:

> The media, litigants, the Congress, and others often allege, rightly or wrongly, that audit failures contributed to many business failures. In that context, the public views audit failures as including not only the failure to discover and report material negative facts, but also the failure of financial statements to serve as an adequate early-warning device for the protection of investors and creditors. (POB 1994, 4)

If the manager has inflated reported financial results and the auditor does not attenuate these manipulations, then the audited financial reports may not provide adequate warning of impending financial problems.

Managers can opportunistically manipulate accounting reports by managing accruals. However, Kaplan (1985) points out that "normal" accruals arising in the ordinary course of business are unlikely to reflect managerial manipulation. Any manipulation of accounting numbers will most likely manifest in "abnormal" accruals. Consequently, I hypothesize that auditors face increased litigation risk if they fail to attenuate managers' propensity to manipulate abnormal accruals to portray an overly favorable impression of the firm's financial health. That is, I expect the risk of auditor litigation to increase with the extent of income-increasing abnormal accruals.

Prior research does not provide conclusive evidence on the relation between accruals and auditor litigation risk. Stice (1991) finds that higher *levels* of accounts receivable and inventory account balances are associated with increased litigation risk. While earnings management may affect the levels of these accounts, the total levels of these account balances should depend primarily on business fundamentals. Lys and Watts (1994) investigate the relation between audit litigation and *total* accruals (rather than abnormal or discretionary accruals). Beyond the use of total rather than abnormal accruals, there are several reasons why their results are inconclusive. Lys and Watts (1994, 84) report conflicting results in their univariate and multiple regression analyses. Based on univariate analysis, they report that litigation firms have more negative (*income-decreasing*) accruals than do control firms. However, based on multiple regression analysis reported in their Table 6, they conclude that litigation is positively related to *income-increasing* accruals. But because Lys and Watts' (1994, 85) sample suffered from missing data, the authors indicated that to conduct this multiple regression analysis, they replaced all missing data values for each client firm with the conditional mean value based on the other sample firms that did have actual data.[4] Finally, Lys and Watts (1994, 91) find no relation between auditor litigation and total accruals for their most recent subsample of lawsuits that allege wrongdoing after 1982. The authors provide no explanation for these mixed results.

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[1] Similarly, Healy and Wahlen (1999, 368) define earnings management as follows: "Earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."

[2] See Healy and Wahlen (1999) for a comprehensive review of the earnings management literature.

[3] Francis et al. (1994a, 20) find that in 37 of 103 class action security lawsuits against client firms, plaintiffs allege "bad" accounting practices including improper revenue recognition and earnings manipulation.

Because prior research provides inconclusive evidence on the relation between accruals and the probability of auditor litigation, I extend Stice (1991) and Lys and Watts (1994) by investigating whether abnormal accruals, estimated using the Modified Jones model (Dechow et al. 1995), are associated with auditor litigation risk. Using a larger and more recent sample of audit litigation cases, I find that the risk of auditor litigation increases with more positive, income-increasing abnormal accruals, even after controlling for other variables that affect litigation. These results are consistent with external stakeholders holding auditors responsible for failure to curb management's exercise of discretion over accruals to present financial statements that portray the firm in a more favorable light. This evidence, in turn, suggests that auditors should carefully scrutinize income-increasing abnormal accruals.

The rest of the paper is organized as follows: Section II explains the sample selection, research method, and empirical model, Section III presents the results, and Section IV presents the paper's conclusions.

II. Sample Selection and Research Method

Sample Selection

I identify an initial sample of 364 lawsuits brought by shareholders of nonfinancial client firms against auditors, by searching the Dow Jones News Retrieval Service, NAARS, LEXIS-NEXIS, previous studies, and cases identified in O'Brien (1996). Of these lawsuits, 192 client firms are not listed on the Compustat Primary, Supplementary, and Tertiary Annual Industrial File or the Research File, and another 105 client firms lack eight years of data required to estimate accruals. These constraints result in a final sample of 67 client firms with alleged misstatements from 1969 to 1998. My nonlitigation control sample consists of randomly selected client firms matched on industry classification and lawsuit time period (62 of the 67 [93 percent] firms were matched using four-digit SIC codes, the other five cases were matched using three-digit SIC codes). These data requirements yield a sample of relatively large, publicly traded firms, which likely pose the greatest business risk to auditors. Brumfield et al. (1983, 60) argue that litigation risk is greater for publicly held clients than for privately held clients, because shareholders sometimes sue auditors even when "the audit and the financial statements comply with professional standards."

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[4] Lys and Watts (1994) report using the conditional mean to complete the data for their sample of 153 client firms for all variables used in their multiple regression analysis. According to their Table 5, client firms with missing data range from a minimum of 54 (lacking total asset data) to a maximum of 113 (lacking the probability of acquisition data) with 91 of the 153 client firms lacking total accrual data.

The resulting sample includes a larger number of lawsuits and more recent lawsuits than Stice's (1994) sample of 49 lawsuits brought from 1960 to 1985, and Lys and Watts' (1994) sample of 40 lawsuits that have complete data and were brought between 1955 and 1994.[5]

Abnormal Accruals

The normal portion of total accruals (sometimes termed "nondiscretionary accruals") is unlikely to reflect earnings management (Kaplan 1985). Thus, my tests focus on the relation between auditor litigation and abnormal accruals (sometimes called "discretionary accruals") that remain after subtracting estimated "normal accruals" from total accruals. Dechow et al. (1995) tested several models purporting to partition total accruals into normal and abnormal components. They conclude that the Modified Jones model is the most effective in identifying abnormal accruals that likely reflect earnings management.[6] Following Dechow et al. (1995), this study estimates abnormal accruals (ABNORMAL_ACCRUALS) as the prediction error from firm-specific ordinary least squares regressions:

$$\text{TOTAL\_ACCRUALS}_{it} = \alpha_i + \beta_{1i}(\Delta\text{REV}_{it} - \Delta\text{REC}_{it}) + \beta_{2i}\text{PPE}_{it} + \varepsilon_{it} \qquad (1)$$

where:

$\text{TOTAL\_ACCRUALS}_{it}$ = ΔCurrent assets_t − ΔCash_t − ΔCurrent liabilities_t + ΔCurrent portion of long-term debt_t − Depreciation and amortization expense_t;[7]
ΔREV_{it} = revenues in year t less revenues in year t − 1;
ΔREC_{it} = receivables in year t less receivables in year t − 1;
PPE_{it} = gross property, plant, and equipment in year t;
i = 1,...,134 firm index; and
t = 1,...,T_i year index for the number of years included in the estimation period for firm i. The estimation periods exclude the year of alleged wrongdoing, and range from 8 to 23 years, with a mean of 13.7 years.

The mean and median adjusted R^2 is 0.41 and 0.40, respectively. Consistent with prior research, the mean coefficient for the change in cash sales is positive (0.19) and thus income-increasing. The mean coefficient for PPE, which should be dominated by depreciation effects, is negative (−0.12) and thus income-decreasing (Jones 1991; Holthausen et al. 1995).

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[5] Stice (1991) begins with an initial sample of 164 firms but concludes with a final sample of 49. Lys and Watts (1994) begin with an initial sample of 472 firms and conclude with a final sample of 153 partial observations. However, Lys and Watts (1994, 85) indicate that their sample includes, at most, 40 observations with complete data for each of the eight variables used in their multiple regression analysis.

[6] The Modified Jones model estimates normal accruals arising from business operations. Healy (1996) and Bernard and Skinner (1996) point out that prediction errors from this type of model measure "discretionary accruals" with error. For example, because the model abstracts from the normal level of accruals, the prediction errors also impound the effect of events that are unusual (relative to the benchmark model) and nondiscretionary. Thus, I label the prediction errors from the Modified Jones model as "abnormal accruals" rather than "discretionary accruals." However, subsequent sensitivity analyses show that my inferences are robust after controlling for unusual events that Collins and Hribar (2000) argue may confound the ability to draw inferences about earnings management from abnormal accruals.

[7] Following Jones (1991), I delete changes to taxes payable due to numerous missing observations from the taxes payable field in earlier Compustat tapes.

Abnormal accruals (ABNORMAL_ACCRUALS) are the prediction errors from applying the Modified Jones model to estimate normal accruals in the year of alleged wrongdoing:

$$\begin{aligned} \text{ABNORMAL\_ACCRUALS}_{it} = {} & \text{TOTAL\_ACCRUALS}_{it} \\ & - (\hat{\alpha}_i + \hat{\beta}_{1i}[\Delta\text{REV}_{it} - \Delta\text{REC}_{it}] + \hat{\beta}_{2i}\text{PPE}_{it}). \end{aligned} \quad (2)$$

Estimated abnormal accruals are scaled by lagged total assets.[8]

Control Variables

Prior research has shown that other factors are associated with litigation against auditors. Auditor characteristics such as audit firm size, the proportion of audit fees received from a particular client, and the length of the auditor-client relationship as well as client characteristics such as the client's financial health, size, and growth have also been shown to be associated with auditor litigation.

Big 5 audit firms generally have more resources, so they are more able to pay settlements or judgments.[9] Indeed, the Big 5 contend that they are subject to frivolous lawsuits due to their perceived "deep pockets" (Arthur Andersen et al. 1992). However, Palmrose (1988) finds that Big 5 auditors have *lower* litigation rates than non-Big 5 auditors, consistent with the notion that Big 5 auditors provide higher quality audits. Although subsequent research does not find a relation between the Big 5 auditor classification and litigation, I include an indicator variable (BIG5) coded as 1 for a Big 5 auditor and 0 otherwise to control for possible differences in litigation risk between Big 5 and non-Big 5 auditors (Stice 1991; Lys and Watts 1994).

DeAngelo (1981) contends that the greater the proportion of total revenues the auditor receives from a particular client, the less objective the auditor will be on that client's engagement. As auditors become less objective (or their professional skepticism begins to erode) the risk of auditor litigation is likely to increase. Stice (1991) and Lys and Watts (1994) provide some (mixed) evidence that the larger (more important) the client relative to the auditor's other clients, the greater the risk of litigation. Thus, following Stice (1991) and Lys and Watts (1994), I control for the client's importance to the auditor by controlling for the ratio of a particular client's sales to the sales of all clients for a given auditor (CLIENT_IMPORTANCE).[10] These data are obtained from *Who Audits America*.

Stice (1991) and St. Pierre and Anderson (1984) argue that auditor litigation risk is greater in early audit engagements because of an increased probability of missing errors due to the auditor's unfamiliarity with the client. In contrast, Lys and Watts (1994) argue that the longer the auditor/client relationship, the more auditor independence declines, which in turn increases litigation risk. Stice (1991) finds that shorter auditor tenure (three years or less) is positively associated with auditor litigation, but Lys and Watts (1994) find no significant relation. Following Stice (1991), I include an indicator variable (SHORT_TENURE) coded as 1 if the client has engaged an auditor for three years or less and 0 otherwise to control for the duration of the auditor/client relationship.

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[8] Scaling each variable in the Modified Jones model by lagged total assets yields identical inferences to scaling $\text{ABNORMAL\_ACCRUALS}_{it}$ by lagged total assets.

[9] Because the Big 8 became the Big 6 and now the Big 5 through mergers, I use the current Big 5 designation to represent the Big 8, Big 6, and Big 5 audit firms identified in prior research.

[10] This proxy assumes a positive relation between the audit fee and client sales. I also developed an alternative measure of client importance based on client sales in the numerator and mean client sales per domestic office in the denominator. This alternative proxy does not affect the study's inferences.

Stice (1991) finds that auditor litigation risk increases as the client's financial condition deteriorates. Carcello and Palmrose (1994) and Bonner et al. (1998) reach similar conclusions, although in contrast, Lys and Watts' (1994, 86) multiple regression results indicate a negative relation between the probability of client bankruptcy and auditor litigation. To control for the effect of the client's financial condition on litigation risk, I include Zmijewski's (1984, 65) financial condition index (FINCOND).[11]

Prior research has consistently shown that auditor litigation risk increases with client size (St. Pierre and Andersen 1984; Stice 1991; Lys and Watts 1994; Carcello and Palmrose 1994). Possible explanations for this result include larger potential damage awards (Kellogg 1984), larger firms issue more disclosures (Francis et al. 1994b), and larger clients generally engage larger auditors who shareholders may view as deep-pocketed litigation targets. Thus, I include the natural log of total client assets (SIZE), to control for client size.

Prior literature contends that high-growth firms have more difficulty establishing and maintaining adequate internal controls than low-growth firms. Stice (1991) and Lys and Watts (1994) argue that client firms experiencing high growth pose greater litigation risk than low-growth clients. Stice (1991) finds some (mixed) evidence that client growth is associated with greater litigation risk, although Lys and Watts (1994) do not. I include the percentage change in client sales (GROWTH), to control for any differences in the growth of client firms between litigation and nonlitigation firms.

Model Specification

I employ the following logistic regression model to investigate whether auditor litigation increases with more positive (income-increasing) abnormal accruals.

$$\begin{aligned} \text{LIT} = {} & \beta_0 + \beta_1\text{ABNORMAL\_ACCRUALS} + \beta_2\text{BIG5} + \beta_3\text{CLIENT\_IMPORTANCE} \\ & + \beta_4\text{SHORT\_TENURE} + \beta_5\text{FINCOND} + \beta_6\text{SIZE} + \beta_7\text{GROWTH} + \varepsilon. \end{aligned} \tag{3}$$

The dependent variable LIT equals 1 if the client firm's auditor is named in a lawsuit and 0 otherwise.

The independent variables are defined as follows:

ABNORMAL_ACCRUALS = estimated abnormal accruals based on the Modified Jones model, divided by lagged total assets;

BIG5 = 1 if a Big 5 auditor, 0 otherwise;

CLIENT_IMPORTANCE = the ratio of a particular client's sales to the sales of all client firms audited by a given auditor;

SHORT_TENURE = if the client has engaged the auditor continuously for three years or less, then SHORT_TENURE equals 1, otherwise SHORT_TENURE equals 0;

FINCOND = Zmijewski's (1984) financial condition index estimates the probability of client failure, so the greater the index the weaker the client's financial condition;

SIZE = the natural log of total client assets; and

GROWTH = the percentage change in the client's sales from year $t - 1$ to year t.

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[11] $\text{FINCOND} = -4.336 - 4.513(\text{ROA}) + 5.679(\text{FINL}) + 0.004(\text{LIQ})$, where ROA = net income/total assets, FINL = total debt/total assets, and LIQ = current assets/current liabilities.

III. RESULTS

Descriptive Statistics and Univariate Analysis

Table 1, Panel A, presents the parametric (Pearson) and nonparametric (Spearman) correlations among the variables. Consistent with the study's hypothesis, the existence of a lawsuit is positively correlated with abnormal accruals ($p \leq 0.02$). In contrast, evidence for total accruals is mixed: the Pearson correlation between LIT and total accruals is significantly positive ($p = 0.05$), but the Spearman correlation is not ($p = 0.50$). Consistent with prior research, abnormal and normal accruals are negatively correlated (Subramanyam 1996).

Table 1, Panel B, shows that for the litigation sample, 45 out of 67 (67 percent) client firms record positive abnormal accruals in the year of alleged wrongdoing. For the control sample, 39 out of 67 (58 percent) client firms record positive abnormal accruals. Detailed inspection of the actual lawsuits reveals that 47 out of the 67 cases (70 percent) specifically allege that the financial statements were either misleading or subject to manipulation.

Table 2 presents descriptive statistics for the independent variables. Relative to the correlations reported in Panel A of Table 1, the matched-pair tests reported in Table 2 provide more powerful tests of differences between litigation and matched control client firms. Consistent with expectations and with the correlations reported in Table 1, litigation firms have significantly more positive (i.e., income-increasing) abnormal accruals than do control firms ($p < 0.014$). There is weak evidence that normal accruals may be more negative in the litigation than in the control sample (t-test $p = 0.078$ and Wilcoxon test $p = 0.116$). Parametric t-tests indicate that total accruals are more positive in the litigation sample than in the control sample, ($p = 0.025$), but nonparametric Wilcoxon signed-rank test results are marginal ($p = 0.101$).

For the financial condition index (FINCOND), the greater the index, the closer the client is to failure. Thus, litigation firms are in weaker financial condition than are control firms ($p < 0.001$). Consistent with prior research, litigation client firms are larger than control client firms ($p < 0.006$). The Wilcoxon tests also indicate that CLIENT_IMPORTANCE ($p = 0.008$) and GROWTH ($p = 0.065$) are higher, on average, for litigation clients than for control clients, but t-tests do not yield significant differences for these two control variables. BIG5 and SHORT_TENURE do not differ significantly between the litigation and control samples.

Logit Analysis

Primary Results

Table 3 presents the results of the cross-sectional logit analysis of 67 litigation and 67 control firms. The results of Model 1 indicate that the probability that the auditor will be sued increases with more positive (income-increasing) abnormal accruals ($p = 0.006$), as hypothesized.[12] Since managerial manipulation of financial reports is most likely to manifest in abnormal accruals, this result supports the hypothesis that litigation risk increases with managers' income-increasing discretionary manipulations.

The probability of litigation is lower for Big 5 auditors ($p = 0.084$), consistent with prior research suggesting that larger auditors incur lower litigation risk (Palmrose 1988). Also consistent with Stice (1991) and Bonner et al. (1998), auditor litigation risk is higher

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[12] I repeated the analysis after replacing the values of the continuous variables with their ranks. The inferences are identical, and the abnormal accruals coefficient is significantly positive at $p = 0.006$. Similarly, confining the logit analysis to the 47 client firms associated with lawsuits specifically alleging misleading financial statements and their matched control firms yields inferences identical to those drawn based on the full sample; i.e., auditor litigation increases with more positive (income-increasing) abnormal accruals ($p = 0.055$).

TABLE 1
Descriptive Statistics for a Sample of 67 Client Firms Whose Auditor is Sued between 1969 and 1998, and a Matched Sample of 67 Control Client Firms

Panel A: Correlation Coefficients (p-values)[a] *among Variables; Pearson Coefficients in Upper Right and Spearman Coefficients in Lower Left (n = 134)*

Variable	*ABNORMAL_ ACCRUALS*	*NORMAL_ ACCRUALS*	*TOTAL_ ACCRUALS*	*BIG5*	*CLIENT_ IMPORTANCE*	*SHORT_ TENURE*	*FINCOND*	*SIZE*	*GROWTH*	*LIT*
ABNORMAL_ACCRUALS		−0.530 (0.000)	0.742 (0.000)	0.053 (0.540)	−0.031 (0.720)	−0.084 (0.331)	−0.058 (0.499)	−0.039 (0.648)	0.259 (0.002)	0.229 (0.007)
NORMAL_ACCRUALS	−0.552 (0.000)		0.173 (0.044)	−0.066 (0.445)	−0.007 (0.929)	0.061 (0.480)	−0.027 (0.752)	0.019 (0.820)	0.082 (0.341)	−0.122 (0.157)
TOTAL_ACCRUALS	0.582 (0.000)	0.179 (0.038)		0.009 (0.913)	−0.042 (0.626)	−0.049 (0.568)	−0.090 (0.300)	−0.030 (0.726)	0.366 (0.000)	0.169 (0.050)
BIG5	0.059 (0.495)	−0.037 (0.666)	−0.026 (0.762)		−0.575 (0.000)	0.002 (0.979)	−0.154 (0.073)	0.203 (0.018)	−0.045 (0.604)	−0.081 (0.344)
CLIENT_IMPORTANCE	−0.106 (0.220)	0.008 (0.923)	−0.060 (0.484)	−0.382 (0.000)		−0.073 (0.398)	−0.008 (0.919)	0.003 (0.967)	−0.048 (0.580)	−0.005 (0.950)
SHORT_TENURE	−0.159 (0.065)	0.056 (0.514)	−0.046 (0.594)	0.002 (0.979)	0.062 (0.471)		0.006 (0.941)	0.164 (0.058)	−0.024 (0.777)	0.016 (0.848)
FINCOND	−0.061 (0.477)	−0.038 (0.656)	−0.177 (0.040)	−0.053 (0.542)	0.101 (0.243)	−0.046 (0.594)		0.040 (0.640)	−0.162 (0.060)	0.249 (0.003)
SIZE	−0.118 (0.171)	0.001 (0.987)	−0.138 (0.111)	0.187 (0.030)	0.706 (0.000)	0.185 (0.031)	0.188 (0.029)		0.088 (0.310)	0.212 (0.013)
GROWTH	0.273 (0.001)	0.106 (0.220)	0.463 (0.000)	−0.040 (0.642)	0.121 (0.161)	−0.004 (0.954)	−0.130 (0.131)	0.106 (0.221)		0.100 (0.249)
LIT	0.196 (0.023)	−0.062 (0.471)	0.058 (0.502)	−0.081 (0.348)	0.181 (0.035)	0.016 (0.848)	0.207 (0.016)	0.217 (0.011)	0.088 (0.308)	

(Continued on next page)

TABLE 1 (Continued)

Panel B: Sign of Abnormal Accruals in Year of Alleged Wrongdoing for Client Firms Whose Auditor is Sued (Litigation Sample) and Matched Client Firms without Auditor-Related Litigation (Control Sample)

	Positive	*Negative*	*Total*
Litigation Sample	45 (67%)	22 (33%)	67
Control Sample	39 (58%)	28 (42%)	67
Total	84	50	134

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[a] Two-tailed.

ABNORMAL_ACCRUALS = estimated abnormal accruals based on the Modified Jones model, divided by lagged total assets;

NORMAL_ACCRUALS = estimated normal accruals based on the Modified Jones model, divided by lagged total assets;

TOTAL_ACCRUALS = total accruals (ΔCurrent assets$_t$ − ΔCash$_t$ − ΔCurrent liabilities$_t$ + ΔCurrent portion of long-term debt$_t$ − Depreciation and amortization expense$_t$) divided by lagged total assets;

BIG5 = 1 if a Big 5 auditor, 0 otherwise;

CLIENT_IMPORTANCE = the ratio of the client's sales to the sales of all client firms audited by a given auditor;

SHORT_TENURE = if the client has engaged the auditor continuously for three years or less, then SHORT_TENURE equals 1, otherwise SHORT_TENURE equals 0;

FINCOND = Zmijewski's (1984) financial condition index estimates the probability of failure, so the greater the index the weaker the client's financial condition;

SIZE = natural log of the client's total assets ($MM);

GROWTH = the percentage change in the client's sales from year t − 1 to year t; and

LIT = 1 if client firm's auditor is sued, 0 otherwise.

TABLE 2
Descriptive Statistics for Client Firms Whose Auditor is Sued (Litigation Sample) and Matched Client Firms without Auditor-Related Litigation (Control Sample)1969–1998[a]
(n = 67 Litigation Firms and 67 Control Firms)

Independent Variable	*Litigation Mean [median] (standard deviation)*	*Control Mean [median] (standard deviation)*	*t-test (p-value)*[b]	*Wilcoxon Signed Rank (p-value)*[b]
Accrual Variables:				
ABNORMAL_ACCRUALS	0.135 [0.069] (0.352)	−0.003 [0.027] (0.226)	2.271 (0.003)	345.5 (0.014)
NORMAL_ACCRUALS	−0.082 [−0.050] (0.222)	−0.032 [−0.050] (0.186)	−1.420 (0.078)	192 (0.116)
TOTAL_ACCRUALS	0.052 [−0.023] (0.335)	−0.035 [−0.032] (0.142)	1.980 (0.025)	205 (0.101)
Control Variables:				
BIG5	0.895 [1.000] (0.308)	0.940 [1.000] (0.238)	−0.940 (0.174)	−9 (0.274)
CLIENT_IMPORTANCE	0.011 [0.001] (0.040)	0.012 [0.000] (0.062)	−0.060 (0.475)	379 (0.008)
SHORT_TENURE	0.283 [0.000] (0.454)	0.268 [0.000] (0.446)	0.190 (0.424)	−4.5 (0.500)

TABLE 2 (Continued)

Independent Variable	*Litigation Mean* *[median]* *(standard deviation)*	*Control Mean* *[median]* *(standard deviation)*	*t-test* *(p-value)*[b]	*Wilcoxon Signed Rank* *(p-value)*[b]
FINCOND	−2.750 [−3.032] (1.745)	−3.456 [−3.447] (0.882)	2.960 (0.001)	461 (0.001)
SIZE	5.810 [5.968] (1.960)	4.942 [4.960] (2.053)	2.500 (0.006)	409 (0.004)
GROWTH	0.182 [0.130] (0.480)	0.108 [0.113] (0.194)	1.160 (0.124)	242 (0.065)

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[a] Variables are defined in Table 1.

[b] One-tailed.

TABLE 3
Results from Logit Models Where a Positive Coefficient Indicates a Higher Probability that the Auditor is Sued
(n = 134)[a]

$$\text{Model 1: } LIT = \beta_0 + \beta_1 ABNORMAL\_ACCRUALS + \beta_2 BIG5 + \beta_3 CLIENT\_IMPORTANCE + \beta_4 SHORT\_TENURE + \beta_5 FINCOND + \beta_6 SIZE + \beta_7 GROWTH + \varepsilon_1$$

$$\text{Model 2: } LIT = \beta_0 + \beta_1 TOTAL\_ACCRUALS + \beta_2 BIG5 + \beta_3 CLIENT\_IMPORTANCE + \beta_4 SHORT\_TENURE + \beta_5 FINCOND + \beta_6 SIZE + \beta_7 GROWTH + \varepsilon_2$$

$$\text{Model 3: } LIT = \beta_0 + \beta_1 ABNORMAL\_ACCRUALS + \beta_2 NORMAL\_ACCRUALS + \beta_3 BIG5 + \beta_4 CLIENT\_IMPORTANCE + \beta_5 SHORT\_TENURE + \beta_6 FINCOND + \beta_7 SIZE + \beta_8 GROWTH + \varepsilon_3$$

	Model 1	*Model 2*	*Model 3*
Variable	*Estimated Coefficients (p-value)*[b]	*Estimated Coefficients (p-value)*[b]	*Estimated Coefficients (p-value)*[b]
Intercept	1.335 (0.219)	1.134 (0.289)	1.355 (0.216)
ABNORMAL_ACCRUALS	2.518 (0.006)		2.383 (0.036)
TOTAL_ACCRUALS		2.011 (0.060)	
NORMAL_ACCRUALS			−0.274 (0.849)
BIG5	−1.807 (0.084)	−1.308 (0.178)	−1.832 (0.084)
CLIENT_IMPORTANCE	−5.208 (0.348)	−3.786 (0.464)	−5.295 (0.344)
SHORT_TENURE	0.063 (0.885)	−0.031 (0.942)	0.069 (0.875)
FINCOND	0.460 (0.005)	0.442 (0.005)	0.463 (0.005)
SIZE	0.298 (0.007)	0.269 (0.010)	0.297 (0.008)
GROWTH	0.314 (0.615)	0.332 (0.615)	0.364 (0.588)
Adjusted R^2	0.18	0.15	0.18
χ^2	29.301 (0.0001)	23.752 (0.0013)	29.336 (0.0003)

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[a] Variables are defined in Table 1.

[b] One-tailed.

for clients in weaker financial condition ($p = 0.005$), and for larger clients ($p = 0.007$).[13] Client importance, auditor tenure, and client growth are not significantly associated with the probability the auditor is sued.

Sensitivity Analysis

Given the limitations of the Modified Jones model in identifying "abnormal" accruals, earnings management is not the only phenomenon reflected in estimated abnormal accruals. Unusual, nondiscretionary events can also lead to abnormal accruals (Bernard and Skinner 1996; Healy 1996; Collins and Hribar 2000). To control for unusual nondiscretionary events identified in Collins and Hribar (2000), I repeated the analysis after excluding all litigation firms that recorded a merger, acquisition, discontinued operation, or foreign-currency translation during the abnormal accrual estimation period. Even though this reduces my sample to 34 pairs of firms, I still find that auditor litigation increases with more positive (income-increasing) abnormal accruals ($p = 0.029$).[14]

I also repeated the analysis after restricting the sample to 38 clients targeted by lawsuits originating in the latter half of my sample period, 1984–1998 (and their matched-pair control counterparts). Despite the reduction in sample size, litigation risk still increases with more positive (income-increasing) abnormal accruals ($p = 0.058$) in this recent sample period. This study's isolation of abnormal accruals and use of more recent data likely provide a more powerful test than Lys and Watts' (1994) analysis of total accruals and auditor litigation in their most recent time period (1983–1994), likely explaining why I find a relation between accruals and auditor litigation in recent periods, while Lys and Watts (1994) do not.

As suggested by Stice (1991) and Bonner et al. (1998), I also added additional control variables for the variance of abnormal returns, client firms from the technology-related industries (SIC codes 357 and 737), and firms accused of fraud through an SEC Accounting and Auditing Enforcement Release (AAER). Although the inclusion of these additional control variables reduces the sample to 53 firm-pairs, it does not affect the study's inferences (the abnormal accruals' coefficient is still significantly positive at $p = 0.013$). Finally, abnormal accruals based on the Modified Jones model (Dechow et al. 1995), as further modified by Beneish (1997) to include lagged total accruals, also yield identical inferences ($p = 0.006$).

Relation between Total Accruals and Auditor Litigation

Model 2 in Table 3 provides a comparison to Lys and Watts (1994). Consistent with their multiple regression results, the total accruals coefficient is positive and significant at $p = 0.06$.[15] Model 3 partitions total accruals into its normal and abnormal components. The results show that auditor litigation risk increases with more positive (income-increasing) abnormal accruals ($p = 0.036$), while normal accruals are not significantly associated with auditor litigation risk.

IV. CONCLUSION

Concern that earnings management is eroding the quality of financial reporting has prompted the Securities and Exchange Commission and others to question the role of the external auditor. To help address that issue, this study examines the relation between earnings management and auditor litigation. Client firms can manage earnings by manipulating accounting accruals. Since managers have limited ability to manipulate "normal" accruals attributable to normal business operations, any such earnings manipulations should manifest as abnormal accruals. This study hypothesizes and provides empirical evidence that auditor litigation increases with the extent to which client firms report higher (i.e., income-increasing) abnormal accruals. These results are consistent with external stakeholders holding auditors responsible for failure to curb management's exercise of discretion over accruals to present financial statements that portray the firm's financial health more favorably. This in turn suggests that auditors should carefully scrutinize income-increasing abnormal accruals. The study's results also indicate that litigation risk is greater for clients in weaker financial condition and for larger clients.

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[13] OLS regression yields identical inferences. In addition, variance inflation factors (VIF) are below 2 for each independent variable, suggesting that my inferences are not attributable to multicollinearity.

[14] Collins and Hribar (2000) also propose an alternative method for calculating total accruals using data from the cash flow statement. However, due to data limitations I am unable to use this method.

[15] Consistent with Stice (1991) and Bonner et al. (1998), Model 2 shows that weaker financial condition increases litigation risk. This result contrasts with Lys and Watts (1994, 86), whose multiple regression results show a negative relation between the probability of client bankruptcy and audit litigation.

Like all research, this study is subject to limitations. First, abnormal accruals are a noisy proxy for "earnings management." As Healy (1996) and Bernard and Skinner (1996) point out, unusual nondiscretionary factors can also lead to abnormal accruals. However, this study's results continue to hold even after controlling for the unusual nondiscretionary events that Collins and Hribar (2000) conclude affect measured abnormal accruals. This supplementary analysis provides further support for interpreting the study's results as evidence that litigation risk increases when management uses discretion over accruals to manage earnings upward. Second, data requirements limit the sample to relatively large, publicly traded firms. While evidence on such clients is of interest because they pose the greatest business risk to auditors, it is inappropriate to generalize beyond this population.

Future research may address whether an auditor litigation threshold exists for clients who manage earnings. Specifically, is there a materiality threshold of earnings management that triggers lawsuits? Future research could also investigate whether particular patterns of abnormal accrual manipulation tend to prompt auditor lawsuits. Finally, evidence on whether audit adjustments that curb accruals management successfully reduce litigation risk would be of interest to practice and to policymakers, as well as to academics.

REFERENCES

Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and Price Waterhouse. 1992. The liability crisis in the United States: Impact on the accounting profession. *Journal of Accountancy* (November): 19–23.

Barth, M. E., J. A. Elliott, and M. W. Finn. 1999. Market rewards associated with patterns of increasing earnings. *The Journal of Accounting Research* 37 (Autumn): 387–413.

Beneish, M. D., and E. Press. 1993. Costs of technical violation of accounting-based debt covenants. *The Accounting Review* 68 (April): 233–257.

———. 1997. Detecting GAAP violation: Implications for assessing earnings management among firms with extreme financial performance. *Journal of Accounting and Public Policy* 16: 271–309.

Bernard, V. L., and D. J. Skinner. 1996. What motivates managers' choice of discretionary accruals? *Journal of Accounting and Economics* 22: 313–325.

Bonner, S. E., Z-V. Palmrose, and S. M. Young. 1998. Fraud type and auditor litigation: An analysis of SEC Accounting and Auditing Enforcement Releases. *The Accounting Review* 73 (October): 503–532.

Brown, L. D., and H. N. Higgins. 2000. Managing earnings surprises in the U.S. versus 12 other countries. Working paper, Georgia State University, Atlanta, GA.

Brumfield, C. A., R. K. Elliott, and P. D. Jacobson. 1983. Business risk and the audit process. *Journal of Accountancy* April: 60–68.

Bruns, W. J., and K. A. Merchant. 1990. The dangerous morality of managing earnings. *Management Accounting* 72: 22–25.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24: 99–126.

Carcello, J. V., and Z-V. Palmrose. 1994. Auditor litigation and modified reporting on bankrupt clients. *Journal of Accounting Research* 32 (Supplement): 1–30.

Collins, D. W., and P. Hribar. 2000. Errors in estimating accruals: Implications for empirical research. Working paper, University of Iowa, Iowa City, IA.

DeAngelo, L. E. 1981. Auditor size and audit quality. *Journal of Accounting and Economics* 3: 183–199.

Dechow, P. M., R. G. Sloan, and A. P. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (April): 193–225.

———, and D. J. Skinner. 2000. Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons* 14 (June): 235–250.

DeFond, M. L., and J. Jiambalvo. 1994. Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics* 17: 145–176.

Fox, J. 1997. Learn to play the earnings game and Wall Street will love you. *Fortune* (March 31): 77–80.

Francis, J., D. Philbrick, and K. Schipper. 1994a. Determinants and outcomes in class action securities litigation. Working paper, University of Chicago, Chicago, IL.

———, ———, and ———. 1994b. Shareholder litigation and corporate disclosures. *Journal of Accounting Research* 32 (Autumn): 137–164.

Gaver, J. J., K. M. Gaver, and J. R. Austin. 1995. Additional evidence on bonus plans and income management. *Journal of Accounting and Economics* 19: 3–28.

Han, J. C. Y., and S. Wang. 1998. Political costs and earnings management of oil companies during the 1990 Persian Gulf Crisis. *The Accounting Review* 73 (January): 103–117.

Healy, P. M. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics* 7: 85–107.

———. 1996. Discussion of a market-based evaluation of discretionary accrual models. *Journal of Accounting Research* 34 (Supplement): 107–115.

———, and J. M. Wahlen. 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13 (December): 365–383.

Holthausen, R. W., D. F. Larcker, and R. G. Sloan. 1995. Annual bonus schemes and the manipulation of earnings. *Journal of Accounting and Economics* 19: 29–74.

Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (Autumn): 193–228.

Kaplan, R. S. 1985. Comments on Paul Healy: Evidence on the effect of bonus schemes on accounting procedure and accrual decisions. *Journal of Accounting and Economics* 7: 109–113.

Kellogg, R. L. 1984. Accounting activities, security prices, and class action lawsuits. *Journal of Accounting and Economics* 6: 185–204.

Key, K. G. 1997. Political cost incentives for earnings management in the cable television industry. *Journal of Accounting and Economics* 23: 309–337.

Levitt, A. 1998. Speech by SEC Chairman: The numbers game. Remarks delivered at the NYU Center for Law and Business, New York, NY, September 28, 1998. Available at http://www.sec.gov/news/speeches/spch220.txt.

Loomis, C. J. 1999. Lies, damned lies, and managed earnings: The crackdown is here. *Fortune* 140 (August 2): 74–92.

Lys, T., and R. L. Watts. 1994. Lawsuits against auditors. *Journal of Accounting Research* 32 (Supplement): 65–93.

O'Brien, V. E. 1996. *A Study of Class Action Securities Fraud Cases 1988–1996*. Emeryville, CA: Law & Economics Consulting Group, Inc.

Palmrose, Z-V. 1987. Litigation and independent auditors: The role of business failures and management fraud. *Auditing: A Journal of Practice & Theory* 6 (Spring): 90–103.

———. 1988. An analysis of auditor litigation and audit service quality. *The Accounting Review* 63 (January): 55–73.

Pourciau, S. 1993. Earnings management and nonroutine executive changes. *Journal of Accounting and Economics* 16: 317–336.

Press, E. G., and J. B. Weintrop. 1990. Accounting-based constraints in public and private debt agreements: Their association with leverage and impact on accounting choice. *Journal of Accounting and Economics* 12: 65–95.

Public Oversight Board (POB). 1994. *Strengthening the Professionalism of the Independent Auditor.* Report to the Public Oversight Board of the SEC Practice Section, American Institute of Certified Public Accountants. Stamford, CT: POB.

Rosenzweig, K., and M. Fischer. 1994. Is managing earnings ethically acceptable? *Management Accounting* 75 (March): 31–34.

Schipper, K. 1989. Commentary on earnings management. *Accounting Horizons* (December): 91–102.

Smith, C. W. 1993. A perspective on accounting-based debt covenant violations. *The Accounting Review* 68 (April): 289–303.

St. Pierre, K., and J. A. Anderson. 1984. An analysis of the factors associated with lawsuits against public accountants. *The Accounting Review* 59 (April): 242–263.

Stice, J. D. 1991. Using financial and market information to identify pre-engagement factors associated with lawsuits against auditors. *The Accounting Review* 66 (July): 516–553.

Subramanyam, K. R. 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22: 249–281.

Sweeney, A. P. 1994. Debt-covenant violations and managers' accounting responses. *Journal of Accounting and Economics* 17: 281–308.

Zmijewski, M. E. 1984. Methodological issues related to the estimation of financial distress prediction models. *Journal of Accounting Research* 22 (Supplement): 59–82.

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Vol. 76, No. 1
January 2001
pp. 127–130

BOOK REVIEWS

Jane L. Reimers, Editor

Editor's Note: The following book reviews were solicited by the previous book review editor, Thomas H. Williams. I would like to thank Tom and the reviewers for these contributions.

LOUIS BRAIOTTA, Jr., *The Audit Committee Handbook—Third Edition* (New York, NY: John Wiley & Sons, 1999, pp. xvii, 446, $60.00 Pb).

This book could easily be called *The Audit Committee Encyclopedia.* It provides audit committee (AC) members with an extensive understanding of their role in corporate governance and discusses the accounting knowledge necessary to fulfill this role. The audience for this book is clearly audit committee members, although it may be a useful reference in some executive M.B.A. programs (depending on the level of corporate governance coverage).

The book is split into five sections: (1) AC members' core responsibilities, (2) the planning function, (3) monitoring and reviewing functions, (4) the reporting function, and (5) detailed Appendices. The approach to each chapter is to provide information on the topic with excerpts from many different sources (e.g., recommendations by the SEC, Auditing Standards Board, National Association of Corporate Directors, Foreign Corrupt Practices Act, etc.). As a result, the reader is pointed to a wealth of additional sources on each topic.

Chapters 1–5 cover the AC members' core responsibilities. This section assumes the reader has no prior accounting or governance knowledge. It starts by explaining the basics: internal and external auditing, audit reports, users of financial statements, and AC requirements for the different stock exchanges. In addition, this section traces the history of governance from the Foreign Corrupt Practices Act (1977) to recent developments concerning independence and fraud detection. Included with the history are several key (but dated) legal cases against corporate directors, along with a discussion of general legal responsibilities of AC members. Finally, the section closes by examining the relationship between GAAS and GAAP.

Audit planning and the role of the AC are discussed in Chapters 6 and 7. The purpose of this section is to familiarize the reader with the external auditor's planning process and to provide practical guidelines to AC members for reviewing and coordinating the overall plan of the external auditors (and internal auditors). Interestingly, the author did not address the AC's role in the auditor-selection process. Also, the instruction in this section seems to place AC members in a passive role, contrary to recent pleas by the SEC for AC members to take a more aggressive stance on ensuring earnings quality. The planning process may offer the AC the best opportunity to define its expectations about the quality of the firm's financial reporting.

Chapters 8–12 cover monitoring and reviewing functions. The author discusses two monitoring functions of the AC: monitoring internal control and monitoring internal audit. The chapter on internal control is probably the weakest link in the book. It follows the evolution of internal control, but stops short of discussing the current guidance on the topic (SAS No. 78). Instead, the terminology used is from prior guidance, which is no longer in effect. In addition to monitoring, the section provides a good overview of three AC review functions: accounting policy disclosures, fraud, and general business practices. The general business practices chapter provides insightful discussions on foreign payments, conflicts of interest, "perks," and other sensitive payment areas.

The reporting function of the AC is covered in Chapters 13 and 14. These chapters familiarize AC members with the different types of audit opinions and with their reporting responsibilities to the full board of directors.

The book closes with a series of 14 Appendices. These range from a historical perspective on ACs to summaries of key acts and codes of conduct (e.g., Federal Deposit Insurance Corporation Improvement Act, AICPA Code of Professional Conduct). The Appendices are a great "one-stop-shop" reference tool.

On the whole, the book provides extensive information for the AC novice. Readers reasonably familiar with auditing and governance issues will not find much new here, but the historical information may offer an enhanced perspective. In addition, researchers may find the wealth of excerpts and sources useful.

Finally, one issue to consider in writing a "handbook" is ease of information acquisition. As I stated in the introduction, this is really an encyclopedia. AC novices looking for greater synthesis of information and more discussion of best practices may want to consult two recent publications: *Report and Recommendations of the Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees* and *Report of the NACD Blue Ribbon Commission on Audit Committees.* These would not supplant the current book, but merely provide a good first read.

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ALFRED RAPPAPORT, *Creating Shareholder Value, Revised Edition* (New York, NY: The Free Press, 1998, pp. xviii, 205, $35.00)

This book is a revision of a highly successful and widely cited 1986 book. The original version of this book was reviewed in *The Accounting Review* in October 1987. In the original book, Professor Rappaport focused on two key concepts: (1) accounting information is potentially misleading for decision making, and (2) discounted cash flow provides a better measure for decisions aimed at maximizing shareholder wealth. These two themes are still major components in the revised edition. Additionally, Professor Rappaport presents, in Chapter 1, an expanded evaluation of the appropriate criterion for management decision making: maximizing shareholder value or balancing the interests of all stakeholders. He makes a persuasive case that maximizing shareholder value is the appropriate goal for determining corporate strategies and in assessing firm performance. Professor Rappaport argues that managers are neither qualified nor politically legitimate to decide on social issues. He therefore suggests that "in a market-based economy that recognizes the rights of private property, the only social responsibility of business is to create shareholder value and to do so legally and with integrity."

Chapter 2 discusses the shortcomings of using unadjusted accounting numbers to measure firm performance when the objective is to maximize shareholder value. The principal sources of this problem are (1) the existence of alternative accounting methods, (2) inadequate recognition (usually understatement) of investment requirements, and (3) the failure to recognize the time value of money. Several simple examples illustrate the failure of earnings as a measure of the change in economic value. Return on equity and return on investment are also shown to have shortcomings as a measure of change in shareholder wealth. Professor Rappaport concludes Chapter 2 by arguing that these problems are not a failure of accounting but rather a failure in the use of accounting information.

Chapter 3 presents a major—perhaps primary—theme of this book: the "shareholder value approach" to measuring the economic value of the firm. Using simple examples, the links between value drivers (sales growth rate, operating profit margin, income tax rate, working capital and fixed investment, cost of capital, and forecast duration) and corporate strategies to create shareholder wealth are illustrated.

Expanding on the value-driver framework, Professor Rappaport discusses formulating business strategies (Chapter 4) and valuing business strategies (Chapter 5). He argues that these two strategies—competitive advantage and shareholder value—are equivalent objectives. In addition, several best-selling strategy books are reviewed and are evaluated based on their authors' ability to successfully integrate strategic formulation and strategic valuation.

Chapter 6 briefly addresses the relation between stock-market expectations and the setting of performance standards. Three standards for rates of return are considered: the cost of capital, the corporate rate of return implied by the market price, and the forecasted corporate rate of return. This leads to the discussion of performance evaluation and executive compensation in Chapter 7. Alternative performance evaluation models (earnings, ROI or ROE, residual income and EVA, change in residual income or EVA and SVA) are examined relative to several desirable attributes (e.g., the model accounts for investment, accounts for risk, is free of accounting distortions, is a reliable signal for maximizing value, and is the best estimate of change in value). It is argued that the earnings model is the poorest performer and the "shareholder valuation added" (SVA) model best meets these desirable attributes.

The merger and acquisition activity of the 1990s leads Professor Rappaport to examine the ability of the SVA approach to estimate the value added by merger and acquisition transactions. Chapter 8 offers a very broad discussion of valuation issues related to mergers and acquisitions. Several examples illustrate the value created (or not created) in some of the more visible transactions of the 1990s. Chapter 9 outlines the process by which the shareholder value approach can be integrated into a firm's culture. Finally, the "correct" way to keep score for shareholders is discussed in Chapter 10. The discussion is aided by specific examples drawn from *The Shareholder Scorecard*, a ranking of industries on rate of return that is published annually by the *Wall Street Journal*. Professor Rappaport provides some brief commentary at the end of this chapter regarding the relationship between historical measures (e.g., P/E ratio), current price, and expected growth. He concludes, "I am confident that the most successful investors will continue to be those who can infer market expectations from stock prices. These investors are not just looking for good companies, they are looking for good stocks."

In summary, this book is an excellent presentation of the shareholder value approach and its application to a variety of problems. It is brief but comprehensive in coverage. This characteristic would allow an instructor to use the book as the principal reading (together with cases) in a course module or as a supplement to a text (or other books) in a normal semester course. The book would probably be most useful in a strategic financial management course at the undergraduate or Masters' level or in an executive M.B.A. module. It would also be useful in a financial statement analysis course. I would also recommend the book for instructors teaching other accounting and finance courses as a brief review of some important contemporary concepts and applications.

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STEVE PLAYER AND DAVID E. KEYS, Eds., *Activity-Based Management: Arthur Andersen's Lessons from the ABM Battlefield*, 2nd edition (New York, NY: John Wiley & Sons, Inc., 1999, pp. 267, $29.95 Hb).

Written from the perspective of cost-management consultants, this book provides an interesting compendium of practical experiences and insightful advice, primarily relating to implementing activity-based management (ABM) in for-profit organizations. The book is organized in three major sections.

The first section, comprising approximately one-fourth of the book, discusses 30 "pitfalls" to be avoided when planning and implementing an ABM project. While the discussion of these pitfalls and the authors' advice on avoiding them do not represent revelations, they do offer sound, well reasoned, practical advice on planning and implementing ABM in a business organization. Topics discussed include (1) the importance of top management buy-in, (2) clear statement of project objectives, (3) employee involvement and training, (4) criteria for pilot-site selection, (5) project management techniques, (6) overcoming resistance to change, and (7) implementation of new reporting systems. In fact, much of this discussion can be easily applied to other non-ABM organizational change initiatives.

The second and largest section of the book describes 12 case studies of successful ABM implementations by Arthur Andersen cost-management experts. The selected organizations represent a cross-section of business purposes, including reengineering, customer profitability analysis, channel mix, and target costing, for a variety of settings ranging from service to manufacturing and for a wide range in scale of operations, from Fortune 50 to regional firms. Because these cases are focused on the broad ABM planning and implementation issues, they appropriately do not include extensive detail on the ABM process or on the underlying activity-based costing (ABC) systems. As a direct consequence, the case studies can be easily understood by managers and students having minimal background knowledge of contemporary managerial accounting topics.

The final section of the book is directed toward future ABM applications. This section focuses on some ABM applications to date that extend beyond simple process and product improvement. Customer profitability analysis, revenue-enhancement strategies, target costing, integrated performance management, and design of reporting systems are described as generic topics. Brief company vignettes are included. This is the least insightful section of the book. The included topics are competently discussed from a textbook perspective, but the topic coverage is limited. This section would be improved with additional discussion of the integration of ABM and emerging information technologies, a more in-depth discussion of enterprise level systems and modeling, and some speculation of what the future may hold, based on the extensive experience of this consulting group.

Overall, the book has several strong points to attract readers. Even for a general business audience, the book is quite easy to read and understand. It has a very pragmatic orientation, offering numerous examples and cases representing a broad cross-section of organizations. To its credit, the book has a strong managerial orientation with little emphasis on the more technical aspects of ABC and ABM.

Who should read this book? First, managers who are or expect to be involved with ABC/ABM change initiatives should benefit from reading this book. Second, more technically oriented finance, accounting, and information technology professionals would likely benefit from this discussion of the significant planning and implementation issues of ABM, as would students aspiring to cost management consulting positions. Students in an advanced managerial accounting or a management-consulting course would find useful practical advice, and such advice might equally apply to those in executive M.B.A. programs. Finally, academic managerial accountants whose practice experience is less than current may gain useful insights and examples to bolster their teaching and research activities.

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AHMED RIAHI-BELKAOUI, *Earnings Measurement, Determination, Management, and Usefulness* (Westport, CT: Greenwood Publishing Group, Inc., 1999, pp. 184, $65 Hb)

This book examines the crucial issues involved in the determination and uses of earnings as a measure of financial performance. The author's central tenet is that the nature and measurement of earnings are subject to various interpretations and management manipulation. Each chapter of the book identifies the nature of the issues surrounding the concept of earnings and presents empirical evidence that can be used to make corporate decisions or to aid in the development of public policy.

The first two chapters examine the nature and the measurement of earnings. Chapter 1 focuses on the transactional approach to earnings determination. Chapter 2 focuses on the capital maintenance concept of earnings determination and examines the measurement of earnings under six alternative asset-valuation and income-determination models: (1) historical cost accounting; (2) replacement-cost accounting; (3) net realizable-value accounting; (4) general price-level accounting; (5) general price-level replacement-cost accounting; and (6) general price-level net realizable-value accounting. While most accountants are already familiar with these concepts, both undergraduate and graduate students should find these two chapters interesting and informative.

Chapter 3 presents a two-stage process of earnings determination. According to the author, the earnings determination process starts with finding the "desired" level of earnings that the firm wants to signal to the capital market. This level is based on both the net wealth generated by the firm (the net value added) and its previous level of earnings. The firm then uses generally accepted accounting principles to manage its earnings to arrive at the desired level. The author used the existence of a correlation between current earnings and the net value-added level and the previous earnings levels to support his claim of this two-stage earnings determination process.

Chapters 4 through 7 examine earnings management and income smoothing with respect to multinationality (in Chapter 5), reputation (in Chapter 6), and industrial sector (in Chapter 7). The empirical evidence presented in these chapters generally supports the notion that management of firms with high levels of multinationality/reputation tends to make income-decreasing accounting choices and that firms in the peripheral sector are more likely to engage in income smoothing. However, given the high correlation between the multinationality measure in the book and firm size, the results on multinationality could simply reflect the size effect that is well documented in the accounting literature.

Chapters 8 through 13 examine the usefulness of earnings in various contexts. Chapter 8 addresses the issue of earnings levels vs. earnings changes as an explanatory variable and concludes that the use of earnings levels rather than changes provides a better explanation of returns. Chapter 9 attempts to document evidence regarding the asset/liability approach vs. the revenue/expense approach to earnings determination. The evidence appears to favor the asset/liability view. Such evidence should be of interest to accounting standard-setting bodies.

The author also compares the informativeness of earnings and cash flows to value-added and documented evidence indicating a clear dominance of value-added information over both earnings and cash flow information. Furthermore, the author finds that nonlinear models have better explanatory power than linear models and that net value-added-based nonlinear models have the best explanatory power. The findings regarding earnings levels vs. earnings changes, linear models vs. nonlinear models, and earnings and cash flows vs. net value added have direct implications for future information content studies.

In summary, this book is well researched and well written. Academicians, students (primarily doctoral students), and practitioners will find this book to be both interesting and useful.

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Editorial Data

The following table contains information about turnaround time for manuscripts received (including revisions) in the 12-month period ended August 31, 2000. Turnaround time is the number of days between the date that the manuscript was received *and the date of the editor's letter to the author(s).*

	Number of Manuscripts	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	70	70	25.45
31 ≤ Days ≤ 60	107	177	64.36
61 ≤ Days ≤ 90	74	251	91.27
91 ≤ Days ≤ 120	21	272	98.91
121 ≤ Days	3	275	100.00

The mean review time was 50 days; the median review time was 51 days.

OCCASIONAL REVIEWERS AND ASSOCIATE EDITORS

The following faculty have graciously donated their time and expertise to assist in evaluating manuscripts for *The Accounting Review* between June 1999 and May 2000. Their support is greatly appreciated.—*The Editor*

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According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal....No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

The primary criterion for publication in *The Accounting Review* is the significance of the contribution an article makes to the literature.

The efficiency and effectiveness of the editorial review process is critically dependent upon the actions of both authors submitting papers and the reviewers. Authors accept the responsibility of preparing research papers at a level suitable for evaluation by independent reviewers. Such preparation, therefore, should include subjecting the manuscript to critique by colleagues and others and revising it accordingly prior to submission. The review process is not to be used as a means of obtaining feedback at early stages of developing the research.

Reviewers and associate editors are responsible for providing critically constructive and prompt evaluations of submitted research papers based on the significance of their contribution and on the rigor of analysis and presentation. Associate editors also make editorial recommendations to the editor.

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THE ACCOUNTING REVIEW
Vol. 76, No. 1
January 2001
pp. 139–170

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COMMITTEE CHARGES

Accounting Education Committee

(Standing Committee of the Association)

Charge: Serve as the coordinating committee for Association activities that involve education. Specifically:

1. Evaluate the charge, proposed objectives, organizational structure, and operating procedures for this committee contained in the Policies and Procedures Manual of the American Accounting Association. Determine whether these continue to be appropriate. If not, recommend alternatives for consideration by the Executive Committee at its Spring 2001 meeting.
2. Work with the Publications Committee to review the newsletters of other educational/research/professional organizations. Develop and recommend to the Executive Committee ways to improve the educational value of *Accounting Education News*.
3. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Ken Harper, DeAnza College
Elizabeth Hawes-Brown, Keene State College
R. David Plumlee, University of Utah
Susan P. Ravenscroft, Iowa State University
Mark A. Rubin, Miami University
Jean Wyer, PricewaterhouseCoopers

Assessment Committee

Charge: Undertake initiatives to provide assessment guidance for college and university accounting programs.
Specifically:

1. Monitor and disseminate information on developments in assessment beyond the boundaries of traditional accounting education.
2. Work with AAA staff to maintain the value of the assessment database developed by the 1999–2000 Assessment Committee.
3. Work with the Innovation in Accounting Education Award Committee to determine whether a separate Innovation in Assessment Award is needed to encourage innovation in assessment. If the committees determine a separate award is warranted, develop and present a proposal to the Executive Committee for the creation and operation of an award program.

4. Identify other initiatives that could assist leaders of accounting programs in meeting their assessment responsibilities.
5. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Bobby R. Cunningham, Grambling State University
John R. Garlick, Sr., South Carolina State University
Debra K. Kerby, Truman State University
Siva Nathan, Georgia State University
Elizabeth Hawes-Brown (AEC Liaison), Keene State College

By-Laws Committee

(Standing Committee of the Association)

Charge: Carry out all activities with regard to changes in the Association's By-Laws.
Specifically:

1. Review previous committees' reports and other important background material.
2. Review existing Association's By-Laws and recommend to the Executive Committee revisions where conflicts exist or other changes are needed.
3. Analyze any proposed changes in the By-Laws coming from other sources and recommend to the Executive Committee changes in form or issues that are not anticipated by such proposals.
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Members: Billy M. Cunningham, University of Missouri-Columbia
Larry E. Rittenberg, University of Wisconsin-Madison

AAA/AICPA/Big 5/IMA Strategic Thinking Project Implementation Committee

Charge:

1. Study reports and recommendations of the AAA/AICPA/Big 5/IMA Strategic Thinking Team.
2. Choose which, if any, of the recommendations should be the subject of AAA faculty development initiatives that would aid interested faculty in implementing the recommendations.
3. Provide a progress report to the Executive Committee in time to be included in the agenda book for the fall Executive Committee meeting.
4. Submit recommendations to AAA Executive Committee in time for consideration at the spring 2001 meeting.

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Jane T. Rubin, AACSB
Keith A. Russell, Southeast Missouri State University

AICPA/AAA Collaborative Award Committee

Charge: Coordinate the AICPA/AAA Collaborative Award Program.
Specifically:

1. Select the recipient(s) of the award according to the agreement between the AICPA and the Association.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Charles F. Malone (AICPA), North Carolina A&T State University
M. Ahmed Naciri (AAA), University of Quebec in Montreal
Richard L. Townsend (AAA), University of Tennessee

Competitive Manuscript Committee

Charge: Coordinate the Association's Competitive Manuscript Award Program.
Specifically:

1. Select one, two or (at most) three recipient(s) of the Competitive Manuscript Award, using criteria approved by the Executive Committee.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Jonathan C. Glover (RAC Liaison), Carnegie Mellon University

Corporate Accounting Policy Seminar Committee

Charge: Plan and hold the Corporate Accounting Policy Seminar in accordance with established AAA policies.
Specifically:

1. Review the previous committees' reports and other important background material.
2. Plan for and arrange to have the 2001 Seminar conducted and administered.
3. Ensure that adequate funding is received for the Corporate Accounting Policy Seminar.
4. Keep the AAA membership, through the Internet or other means, informed of:
   a. Developments in the corporate accounting community.
   b. Research opportunities in the corporate accounting sector.
5. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Deloitte & Touche Wildman Medal Award Committee

Charge: To administer the John R. Wildman Medal award program in accordance with the terms of the grant from the Deloitte & Touche Foundation.
Specifically:

1. Select a recipient for the award for the year 2000–2001.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Karl A. Muller, III, Pennsylvania State University
John J. Wild, University of Wisconsin-Madison
Alison J. Kirby-Jones (RAC Liaison), Boston University

Distinguished International Lecturers Committee

Charge:

1. Evaluate the effectiveness of the International Lecturers program. The evaluation should include seeking input from the Globalization Initiatives Committee.
2. Recommend discontinuance, continuance without modification, or continuance with modification.
3. If continuation with modification is recommended, address issues including (a) whether both incoming and outgoing lectureships should be continued, (b) areas of the world that should be targeted for visits, (c) assistance that should be provided to lecturers by AAA, (d) approaches to increasing the value of the program to lecturers and AAA, and (e) funding.
4. Present a report summarizing committee responses to charges 2 and 3 to the AAA Executive Committee in time for consideration at its Spring 2001 meeting.
5. If continuation of outgoing lectureships is recommended, select the area for the outgoing lecturer to visit in 2003.
6. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Mohan Venkatachalam, Stanford University
Frederick H. Wu, University of North Texas

Doctoral Consortium Committee

Charge:

Specifically:

1. Plan and hold the 2001 Doctoral Consortium in accordance with established AAA policies.
    a. Review previous committees' reports and other important background material.
    b. Plan for and arrange to have the 2001 Consortium conducted and administered, and consider whether the arrangements for the Consortium should be altered in the interests of improving the value of the Consortium for attendees.
    c. Report on the results and effectiveness of the Consortium and recommend any changes to the Executive Committee in time for inclusion in the agenda book for the August 2001 Executive Committee.
2. Evaluate the structure, content, and operation of the Doctoral Consortium. If appropriate, provide recommendations for improvement in time for consideration at the August 2001 Executive Committee meeting.

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Doctoral Fellowships Committee

Charge: Carry out all activities with regard to the Association's doctoral fellowship program.

Specifically:

1. Select the 2000–2001 recipients of the doctoral fellowship grants using the criteria established by the Executive Committee.
2. Evaluate the doctoral fellowship grant program and recommend changes, as appropriate, to the Executive Committee.
3. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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R. David Plumlee (AEC Liaison), University of Utah

E & Y Technology Conference Committee

Charge: Plan and hold the 2001 E & Y Technology Conference in accordance with established AAA policies.
Specifically:

1. Review report on the 2000 E & Y Technology Conference.
2. Plan and conduct the 2001 E & Y Technology Conference.
3. Submit report on the 2001 E & Y Technology Conference to the Executive Committee in time for review at the summer 2001 meeting.
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Lisa Pals, Ernst & Young LLP
David W. Wright, University of Michigan

Faculty Development Advisory Committee

Charge: Serve in an advisory capacity for the Association's Director of Faculty Development.
Specifically:

1. Serve as a sounding board for the Director of Faculty Development and Executive Director on new faculty development initiatives.
2. Assist in the establishment of faculty development priorities so that an appropriate balance is maintained among the areas of teaching, research, practice, and service.
3. Evaluate the merits of developing a program that would allow faculty members to follow a course of study in a specific area (e.g., course design, information technology).
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Marjorie K. Shelley, University of Illinois at Urbana–Champaign
Paul J. Steinbart, Arizona State University
Tracey Sutherland, American Accounting Association

Financial Committee

(Standing Committee of the Association)

Charge: Assist the Executive Committee in monitoring and improving all aspects of the Association's finances.

Specifically:

1. Review the previous committees' reports and other important background material.
2. Evaluate additional or alternative ways to finance existing Association activities.
3. Plan financial strategies for Association initiatives and activities.
4. Work with the 2001–2002 President-elect in preparing the 2001–2002 budget.
5. Monitor the investment of AAA funds in accordance with established Executive Committee policies and procedures.
6. Oversee the budgeting system for the Association, including appropriate costing of products and services. (Issues regarding publications should be coordinated with the Publications Committee.)
7. Review, as needed, Association costs (such as employee benefits) and recommend changes, as appropriate.
8. Undertake special initiatives concerning the financial goals and strategies of the Association as directed by the President or Executive Committee.
9. Compare AAA operating ratios and sources of revenues to those of comparable associations reported in the most recent *ASAE Operating Ratio Report.* Provide results of the comparison to the Executive Committee in time for its Fall meeting.
10. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Larry E. Rittenberg, University of Wisconsin–Madison
Ellen L. Sweatt, Georgia Perimeter College

Financial Accounting Standards Committee

Charge: Coordinate all Association activities with respect to financial accounting standard setting. Specifically:

1. Evaluate selected discussion memoranda and exposure drafts related to financial accounting and reporting in the private sector as they are released by the FASB, IASC, G4 + 1, and other accounting standard-setting groups, and respond to those groups in writing and by appearing at selected public hearings.
2. Stay cognizant of emerging issues related to financial accounting and reporting in the private sector through materials issued by the Emerging Issues Task Force and other relevant sources, and evaluate, where appropriate, the significance and potential implications of such issues.
3. Meet with the FASB, normally on an annual basis.
4. Recognize emerging international issues related to financial accounting, reporting, and auditing; alert others inside the Association about their importance to determine the likely significance and potential implications of such issues.
5. Explore the publication of selected responses by the committee in *Accounting Horizons* or other appropriate outlets.
6. Consider and promote ways to increase the quantity and quality of academic input to the standard-setting process.
7. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Katherine Schipper, Duke University
Catherine M. Schrand, University of Pennsylvania
Douglas J. Skinner, University of Michigan
Linda Vincent, Northwestern University

Financial Reporting Issues Conference Committee

Charge: Plan and hold the 2001 Financial Reporting Issues Conference in accordance with established AAA policies.
Specifically:

1. Review previous committees' reports and other important background material.
2. Seek the advice of appropriate Association committees on the content and structure of the 2001 Conference.
3. Coordinate the conduct and administration of the Conference.
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Annette L. Beatty (Anne), Penn State University
James Leisenring, Financial Accounting Standards Board
Robert C. Lipe, University of Oklahoma
Thomas Porter, Financial Accounting Standards Board
John Smith, Deloitte & Touche
Terry D. Warfield, University of Wisconsin-Madison
James M. Wahlen (RAC Liaison), Indiana University

Globalization Initiatives Committee

Charge: Provide direction through the Executive Committee to accelerate the globalization of the Association.

Specifically:

1. Develop a globalization strategy for the association. Present it to the Executive Committee for consideration at its November 2000 meeting.
2. Coordinate the following activities concerning the Globalization Conferences:
   a. Review the 2000 AAA/BAA Second Globalization Conference in Cambridge.
   b. Organize the 2001 AAA/Schmalenbach–Gesellschaft Third Globalization Conference in Berlin.
   c. Make a recommendation concerning, and plan (if appropriate), the Fourth Globalization

Conference.

   d. Develop criteria for future Globalization Conferences including geographical diversity, criteria for partner organizations, and interests of Association members.
3. Network with other international organizations.
4. Network with sections in the Association.
5. Coordinate globalization activities with other Association activities.
6. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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O. Finley Graves, Kansas State University
Joanna L. Ho, University of California at Irvine
Cynthia G. Jeffrey, Iowa State University
Hans Peter MoellerAachen University of Technology
Gerhard Mueller, FASB

Information Technology Interaction Committee

Charge:

1. Prepare a three-part report and submit it to the AAA Executive Committee in time for consideration at its August 2001 meeting. The report should achieve the following:

   a. Part I: Provide an overview of accounting information processing in organizations of varying levels of IT integration.
   b. Part II: Review the existing literature and, if necessary, gather additional evidence to describe the current status of IT education and research.
   c. Part III: Recommend steps that can be taken to improve intellectual interaction and curricular integration among IT/Systems faculty and those teaching more traditional accounting courses.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

Chair: Steve G. Sutton
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Susan F. Haka (Sue), Michigan State University
Stewart A. Leech, The University of Melbourne
Andrew Lymer, The University of Birmingham
Philip M.J. Reckers (Phil), Arizona State University
Alan Sangster, The Open University Business School
Rajendra P. Srivastava, University of Kansas

Innovation in Accounting Education Award Committee

Charge: Coordinate all activities with regard to the Innovations in Accounting Education Award. Specifically:

1. Select the recipient(s) of the Innovation in Accounting Education Award, using the criteria approved by the Executive Committee.
2. Summarize, describe, and include on the Internet, projects or innovations nominated for the award.
3. Consider the criteria for the award and recommend changes, as appropriate.
4. Work with the Assessment Committee to determine whether a separate Innovation in Assessment Award is needed to encourage innovation in assessment.
5. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

Chair: Robert J. Capettini
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Bruce K. Behn, University of Tennessee
Allen Boston, Ernst & Young LLP
Julia Smith David, Arizona State University
Leslie G. Eldenburg, University of Arizona
Bill N. Schwartz, Virginia Commonwealth University
Richard A. Turpin (Rick), Tennessee at Chattanooga

Membership Advisory Committee

Charge: Advise the staff and Executive Committee on membership services for all current and potential members of the Association.

Specifically:

1. Provide input and assistance to the Executive Director and his staff in developing and implementing a member services plan to assure the growth and viability of the Association.
2. Work with the Two-Year College Faculty Relations Committee to increase the involvement of two-year college faculty in the Association.
3. Develop and assist in implementing recommendations to encourage new faculty to become actively involved in the Association early in their careers.
4. Develop recommendations to address the unique needs of Association members who are retired, including, but not limited to following up on the recommendations of the Former Retired Members Committee.
5. Develop recommendations concerning ways to keep members active throughout their careers, as well as after they retire.
6. Involve the 2000–2001 President and other Executive Committee members in bringing new members into the Association.
7. Advise the staff on implementing the Academic Partners program, particularly in areas where that program is intended to motivate increased AAA membership.
8. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Members: Barry J. Bryan, The University of Mississippi
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Mark Higgins, University of Rhode Island
Anthony T. Krzystofik, Professor Emeritus, University of Massachusetts
Wayne A. Label, University of Nevada, Las Vegas
Sean A. Peffer, University of Kentucky
Alan Reinstein, Wayne State University
John D. Rossi, III, Moravian College
Seleshi Sisaye, Duquesne University
William W. Stammerjohan (Bill), Mississippi State University

Minority Faculty Development Committee

Charge: To coordinate Association activities with respect to minority recruitment and development.

Specifically:

1. Identify issues of broad concern to minority faculty members and suggest ways the Association can help address these issues.
2. Explore ways in which minority candidates can be encouraged to apply to accounting programs and pursue professional careers in accounting education, including liaison with the KPMG Ph.D. project, AICPA, and other groups interested in minority issues, and suggest ways the AAA can assist or work with them or can benefit from their work.
3. Evaluate and follow up on results of 1999–2001 member survey.
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Charles D. Bailey, University of Central Florida
Quinton Booker, Jackson State University
Mark Hale, Blinn College
Linda Holmes, Grambling State University
Alicia Jackson, Tuskegee University
Janice R. Mereba, Delaware State University

New Faculty Consortium Committee

Charge: Plan and hold the 2001 New Faculty Consortium in accordance with established AAA policies.

Specifically:

1. Review previous committees' reports and other important background material.
2. Arrange for the conduct and administration of the Consortium.
3. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Dennis R. Reigle, Arthur Andersen LLP
E. Kay Stice, Brigham Young University
Teri L. Yohn, Georgetown University
Joseph V. Carcello (Joe) (AEC Liaison), University of Tennessee

2000–2001 Nominations Committee

(Standing Committee of the Association)

Charge: Carry out all necessary activities to precede the Association's annual election.

Specifically:

1. Select a list of nominees to AAA offices for election by the membership in Spring 2001 and carry out other duties specified in the By-Laws and Policy and Procedures Manual.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

Chair: W. Steve Albrecht
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Michael A. Diamond, University of Southern California
Donna R. Philbrick, Portland State University
Richard P. Weber (Dick), Michigan State University
Jan R. Williams, University of Tennessee
Stephen A. Zeff, Rice University

Notable Contributions to Accounting Literature Award Screening Committee

Charge: Coordinate all activities necessary to screen candidates for the Notable Contributions to Accounting Literature Award.

Specifically:

1. Identify works of exceptional merit from published accounting books and articles that meet the guidelines for the "Notable Contributions" award, as established by the Executive Committee.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Merle M. Erickson, University of Chicago
Paul E. Fischer, Penn State University
Richard Fleischman, John Carroll University
James R. Frederickson, Hong Kong University of Science and Technology
Mary S. Harris, Syracuse University
Ron Kasznik, Stanford University
Oliver Kim, University of Maryland
Lillian F. Mills, University of Arizona
V. G. Narayanan, Harvard University
Daniel E. O'Leary (Dan), University of Southern California
Ray J. Pfeiffer, University of Massachusetts
Suresh Radhakrishnan, University of Texas at Dallas
Kevin M. Raedy, University of North Carolina at Greensboro
Lynn L. Rees, Texas A&M University
Richard C. Sansing, Dartmouth College
Marjorie K. Shelley, University of Illinois at Urbana–Champaign
Naomi S. Soderstrom, University of Colorado at Denver
Lynda Thoman, Purdue University
James S. Wallace, University of California, Irvine
Beverly R. Walther, Northwestern University

Notable Contributions to Accounting Literature Award Selection Committee

Charge: Carry out all activities to select recipients of the Notable Contributions to Accounting Literature Award.

Specifically:

1. Select the recipient(s) of the award from those books and articles identified by the Screening Committee as potentially notable contributions in accounting literature.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Stephen P. Baginski (AICPA), Indiana University
Thomas J. Frecka (AICPA), University of Notre Dame
Lynford E. Graham (AICPA), BDO Seidman LLP
Kenneth S. Lorek (Ken) (AAA), North Arizona University
Mark W. Nelson (AAA), Cornell University
Zoe-Vonna Palmrose (AICPA), University of Southern California
Kathy R. Petroni (AAA), Michigan State University
David A. Ziebart (Dave) (AAA), University of Illinois

Outstanding Accounting Educator Award Committee

Charge: Carry out all activities related to the Association's Outstanding Educator Award program.

Specifically:

1. Select one or (at most) two recipient(s) of the Outstanding Accounting Educator Award, using criteria approved by the Executive Committee.
2. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

Chair: Thomas (Tom) R. Dyckman
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Members: Dennis R. Beresford (Denny), University of Georgia
James E. Hunton (Jim), University of South Florida
W. Bruce Johnson, University of Iowa
Marlys G. Lipe, University of Oklahoma
Linda S. McDaniel, University of North Carolina
Donald P. Pagach, North Carolina State University

Practice Advisory Committee

Charge: Provide broad guidance to the Executive Committee with regard to the Association's relations with practice.

Specifically:

1. Provide advice and support for the Vice President–Practice on the implementation of the strategic plan in the goal area of "Contribute to Excellence in Accounting Practice."
2. Develop and assist in implementing a practice (corporate) relations program for the Association.
3. Recommend to the Executive Committee other ways to strengthen ties between education and, specifically, the Association and accounting practice.
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Members: Bryan K. Church, Georgia Institute of Technology
John Core, University of Pennsylvania
Karen L. Hooks, University of Miami (Visiting)
Bette Kozlowski, KPMG Peat Marwick LLP
Gary A. Luoma, University of South Carolina
David B. Pearson, Ernst & Young LLP (Retired)

Professionalism and Ethics Committee

Charge: Foster ethical conduct among members and ethics education and scholarship in the accounting profession.

Specifically:

1. Explore avenues for fostering ethics education and scholarship over time and, where appropriate, make recommendations to the Executive Committee.
2. Propose and, if approved, organize and conduct CPE and concurrent sessions at the regional and national meetings, as warranted.

3. Act as a resource on ethics in the accounting profession to the Executive Committee, regions, sections, other committees and other groups.
4. Work with the Webmasters Committee to include teaching materials (cases, teaching notes, syllabi, etc.) related to ethics on the Internet.
5. Evaluate the current charge of this Committee. If appropriate, recommend changes to the Executive Committee.
6. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Pamela B. Roush, University of Central Florida
Linda Thorne, York University
John M. Thornton, U.S. Air Force Academy
Pierre L. Titard, Southeastern Louisiana University
Lori Zulauf, Slippery Rock University

Program Advisory Committee

Charge: Assist in the preparation of the annual meeting program.
Specifically:

1. Assist the President and Executive Director in developing the concurrent portion of the technical program for the 2001 Annual Meeting in Atlanta. Implement electronic submission and review procedures as feasible.
2. Provide advice and consultation to the President concerning the plenary and luncheon speakers for the 2001 Annual Meeting.
3. Evaluate the process by which the content of the Annual Meeting, and particularly the concurrent sessions, is determined and provide advice and consultation to the Executive Committee with regard to future annual meeting programs.
4. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Marilyn Greenstein, Lehigh University
Jane Kennedy, University of Washington
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Maureen F. McNichols, Stanford University
Kenneth A. Merchant, University of Southern California
Daniel E. O'Leary, University of Southern California
Robin W. Roberts, University of Central Florida
Georgia C. Saemann, University of Wisconsin–Milwaukee
Wim A. Van der Stede, University of Southern California
Dan R. Ward, University of Louisiana at Lafayette

2000–2001 Publications Committee

(Standing Committee of the Association)

Charge: Monitor and coordinate all aspects of the Association's publications.
Specifically:

1. Recommend candidates for the editor-elect positions.
2. Evaluate and monitor trends in electronic publishing.
3. Recommend methods and timing for the electronic publication of the Association's journals.
4. Monitor and recommend means of maintaining the economic viability of the Association's publications.
5. Recommend changes in the Association's publications as deemed appropriate.
6. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Lisa L. Koonce, University of Texas at Austin
Sandra S. Kramer, University of Florida
Robert Libby, Cornell University
Gregory B. Waymire, Emory University

Research Advisory Committee

Charge: Serve as the coordinating committee for Association activities that involve accounting research.
Specifically:

1. Monitor the accounting research activities of other accounting associations (e.g., AICPA, FEI, IIA, and IMA) and coordinate with those organizations, as appropriate.
2. Advise the Vice President–Research in the development and administration of the Association's programs in accounting research, including contributing to effective initiatives

undertaken by headquarters' staff involved in faculty development, the regions, and the sections.
3. Suggest ways to encourage research in accounting, including research related to discovery, integration, application, and teaching.
4. Provide effective research liaison with regions and sections.
5. Coordinate the work of research-designated committees, such as the Competitive Manuscript Committee, the Corporate Accounting Policy Seminar Committee, the Deloitte & Touche Wildman Medal Award Committee, the Doctoral Consortium Committee, the Financial Reporting Issues Conference Committee, the New Faculty Consortium Committee, and the Notable Contributions to Accounting Literature Award Selection Committee.
6. Evaluate the current charge of this committee. If appropriate, recommend changes to the Executive Committee.
7. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Steven J. Kachelmeier, University of Texas at Austin
Alison J. Kirby-Jones, Boston University
Ella Mae Matsumura, University of Wisconsin–Madison
Bente Villadsen, University of Iowa
James M. Wahlen, Indiana University

Securities and Exchange Commission Liaison Committee

Charge: Conduct activities as appropriate to assist communication and interaction between the SEC and the membership of the Association.
Specifically:
1. Prepare and transmit a response to the staff of the Securities and Exchange Commission on selected proposals soliciting views from the public concerning auditing and financial accounting and reporting.
2. Make recommendations and/or develop program(s) that will assist the teaching of, and conducting research on, topics related to the SEC and its activities.
3. Make recommendations to the Executive Committee for activities that will enhance the quality and quantity of interactions between the SEC and the Association.
4. Keep AAA members, through the use of the Internet or other means, informed of:
   a. SEC developments
   b. Research opportunities related to SEC work or issues with which they are dealing
   c. The SEC Academic Fellow Program
5. Consult with selected regional program chairs early in the academic year to facilitate sessions that include a presentation by the SEC Academic Fellow.
6. Assist the recruiting of SEC Academic Fellow candidates.
7. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Members: J. Richard Dietrich (Dick), United States Securities and Exchange Commission
Patricia M. Fairfield, Georgetown University
Chris E. Hogan, Vanderbilt University
David B. Smith (Dave), Iowa State University

Trends and Issues Monitoring Committee

(Formerly Environmental Screening Committee)

Charge: Assist accounting educators and the Executive Committee in long-range planning. Specifically:

1. Identify and monitor opportunities and risks for accounting educators presented by changes in the economy, competition, regulation, technology, business, professional services, and demographics.
2. Prepare biannual reports on the implications of these opportunities and risks for accounting educators and the AAA. Provide reports to Executive Committee in time for consideration at their fall and spring meetings. Disseminate information to AAA members as deemed appropriate.

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Michael L. Ettredge (Mike), University of Kansas
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Penelope Sue Greenberg, Widener University
Anita Sawyer Hollander, University of Tulsa
Ian Mackay, American Institute of Certified Public Accountants
Miklos A. Vasarhelyi, Rutgers University–Newark
Liv Watson, Gaither Technologies LLC
Stephen Young, Financial Accounting Standards Board

Trueblood Seminars Committee

Charge: Assist Deloitte & Touche in conducting the Trueblood Seminars. Specifically:

1. In conjunction with Deloitte & Touche, arrange to have the seminars conducted and administered.
2. Report on the results and effectiveness of the seminars and recommend changes in time for consideration by the Executive Committee at its August 2001 meeting.
3. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Members: Mark M. Chain, Deloitte & Touche LLP
Margaret Hicks, Howard University
Richard W. Houston (Rich), University of Alabama
Charles R. Miller (Tad), California Polytechnic State University-San Luis Obispo
Sarah E. Nutter, George Mason University
Marcus Dean Odom, Southern Illinois University

Two-Year College Faculty Relations Committee

Charge: Encourage involvement of two-year faculty in the Association and facilitate interaction between two-year faculty and faculty at other institutions.

Specifically:

1. Review the work of the Committee for the last three years and follow up on all recommendations, including those that have been implemented by the Executive Committee as well as those that have not been implemented.
2. Work with the Membership Advisory Committee and Director of Faculty Development to determine additional incentives for two-year faculty members to become active members of the Association.
3. Work with the Director of Faculty Development in the design and implementation of the Academic Partners program as that programs relates to two-year colleges.
4. Advise the Executive Committee on additional actions it should consider in order to encourage the participation of two-year faculty members in the Association.
5. Evaluate the current charge of this committee. If appropriate, recommend changes to the Executive Committee.
6. Provide a progress report to the Executive Committee liaison in time to be included in the agenda book for each Executive Committee meeting.

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Members: Chak-Tong Chau (Tony), University of Texas at San Antonio
Barbara Chiappetta, Nassau Community College
Ken Harper, DeAnza College
William Harvey (Bill), Henry Ford Community College
Andrew H. Lawrence, Delgado Community College
Kate Mooney, St. Cloud State University
Carolyn A. Strand, Seattle Pacific University
Martha L. Wartick (Marty), University of Northern Iowa
Jane E. Campbell (AEC Liaison), Kennesaw State University

Webmasters Committee

Charge: Facilitate activities related to the ongoing AAA development of the Internet as a vehicle for information dissemination and resource acquisition.

Specifically:

1. Actively develop section and regional web pages in coordination with the Executive Committee of the AAA and the AAA Webmaster.
2. Facilitate Webmaster transition for all section and region homepages and if necessary provide assistance and advice to new Webmasters.
3. Facilitate the recruitment of new Webmasters for all sections and regions.
4. Facilitate AAA members in the acquisition of data located on the Internet related to Research, Teaching, and Faculty Development. This should include, but is not necessarily limited to, providing assistance in locating, downloading, and extracting data available on the Internet in various file formats.
5. Continually assess the viability of moving separate section and region homepage sites to a centralized facility with remote Webmaster access or the acquisition of registered Internet addresses for each section and region that provide a common address for accessing a section or region homepage regardless of its physical location.
6. Disseminate information to, in coordination with the AAA Webmaster, AAA members regarding recent technology changes and availability that may enhance AAA member research, teaching, and development.
7. Provide the Executive Committee, through the designated liaison, reports on the Committee's activities for each Executive Committee meeting (dates to be determined).
8. Provide advice and counsel to the Executive committee, the AAA Webmaster, and the AAA Sarasota Office regarding the adoption of or need for new technology to better facilitate the AAA overall objectives.

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Andrew Priest, Edith Cowan University
Dasaratha V. Rama, Texas A&M International University
Vernon Richardson, University of Kansas
J. Timothy Sale, University of Cincinnati
Dennis Schmidt, University of Northern Iowa
Monte R. Swain, Brigham Young University

JANUARY 2001 PLACEMENT ADS

The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The ***Review*** *is published on the first day of January, April, July, and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.*

101 DARTMOUTH COLLEGE, Amos Tuck School of Business Administration (graduate school of management), is conducting a faculty search in Financial Accounting with a focus on financial reporting and capital markets. We are open to all levels of appointment—Assistant Professor, Associate Professor, or Full Professor. However, there is a preference for those who have at least three years' experience since completing their Ph.D. We are interested in candidates who will produce research of excellent quality that will have high impact on the field. The candidate should be able to teach Tuck's "core" Financial Accounting course as well as offer more specialized second-year electives. There must be evidence that the candidate can conduct research and teach at a level of quality consistent with Tuck's high standards. Send resumes to Professor Richard Sansing, The Tuck School, 100 Tuck Hall, Hanover, NH 03755. Dartmouth College is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

102 SOUTHEAST MISSOURI STATE UNIVERSITY invites applications for Assistant/Associate/Full Professor in Accounting. These tenure-track positions are available Fall 2001. Responsibilities include teaching undergraduate/graduate Accounting courses; demonstrating an active scholarly agenda and commitment to professional service consistent with teacher-scholar model and AACSB accreditation standards; student advising and participation in committee work, public service, and professional organizations. Ph.D. or D.B.A. with strong emphasis in accounting required; professional certification (CPA, CMA, or CIA) and practical business/accounting experience desirable. University teaching and recent scholarly accomplishments are preferred. Strong communication and interpersonal skills are expected. Candidates should have demonstrable commitment to teacher/scholar model, public and University service, and a culturally diverse learning environment. Send resume, including brief statement of teaching philosophy; documentation of teaching effectiveness; example of scholarly work; names, addresses, telephone numbers of three references; and all transcripts. Review of applications will begin after November 15, 2000 and continue until the position is filled. Contact Dr. Debbie Beard, Chairperson, One University Plaza MS5815, Cape Girardeau, MO 63701; Phone: (573) 651-2118; Email: dfbeard@semovm.semo.edu; Fax: (573) 986-6117. Southeast Missouri State University is an Equal Opportunity/M/F/Affirmative Action Employer. Women and minorities are encouraged to apply.

103 UNIVERSITY OF WESTERN ONTARIO, Richard Ivey School of Business, seeks candidates for a tenure-track position, tenured appointment, or limited-term position in the area of Management Accounting and Control. The position is available to begin in September 2001. The successful candidate will demonstrate a strong commitment to the practice of management in both research and teaching. This position is subject to budget approval. Contact Professor Claude Lanfranconi; Telephone: (519) 661-3225; Email: clanfran@ivey.uwo.ca. The Richard Ivey School of Business, an internationally recognized business school, and the University of Western Ontario are committed to employment equity, welcome diversity in the workplace, and encourage applications from all qualified individuals including women, members of visible minorities, aboriginal persons, and persons with disabilities. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

104 WRIGHT STATE UNIVERSITY invites applications for a tenure-track position in the Department of Accountancy at the rank of Assistant Professor, beginning Fall 2001. Teaching responsibilities will be primarily in Financial Accounting. Applicants must possess a doctorate in Accounting and be academically qualified under AACSB guidelines. Refereed publications, professional certification, and relevant business experience are preferred. Applicants should have a commitment to excellence in teaching, service, and ongoing scholarship. The Department of Accountancy offers Bachelor's and Master's programs in Accountancy and is separately accredited by AACSB. First consideration will begin January 15, 2001 and continue until filled. Please send application letter, *curriculum vitae*, and three references with contact information to Dr. Kennard S. Brackney, Chair, Department of Accountancy, College of Business and Administration, Wright State University, 3640 Colonel Glenn Highway, Dayton, OH 45435-0001. Email: ken.brackney@wright.edu. Wright State University is an EO/AA Employer.

105 UNIVERSITY OF NOTRE DAME, Department of Accountancy, invites applications for position openings at the Assistant and Associate Professor levels. All research areas will be considered. Applicants for Assistant Professor positions should expect to complete doctoral degree requirements before the start of the contract period. All candidates should have a strong commitment to scholarly research and excellence in teaching. Salary is very competitive and research support is excellent. Please send *curriculum vitae* and an example of scholarly work to Professor Tom Schaefer, Chair, Department of Accountancy, Room 102D, College of Business Administration, University of Notre Dame, Notre Dame, IN 46556-5646. The University of Notre Dame is an Equal Opportunity/Affirmative Action Employer.

106 UNIVERSITY OF CONNECTICUT, Accounting Department, invites applications for two anticipated accounting faculty openings at all ranks, depending upon qualifications, for Fall 2001 at the Storrs campus. The ability to teach and develop new courses in Accounting Information Systems within the Accounting Department is very important. Candidates should hold an earned doctorate or be near completion. These positions extend the opportunity to teach at the undergraduate, M.S., M.B.A., and Ph.D. levels and engage in research in a supportive environment. The Storrs campus is located in an outstanding rural area, yet is convenient to several major Northeastern cities, including New York and Boston. Contact Richard F. Kochanek, Accounting Department Head, University of Connecticut, U-Box 41A, 2100 Hillside Road, Storrs, CT 06269-1041; Email: dickk@sba.uconn.edu; Phone: (860) 486-2864. Visit our Accounting Department web site at www.sba.uconn.edu/accounting/index.html. We encourage applications from underrepresented groups, including minorities, women, and people with disabilities.

107 STATE UNIVERSITY OF NEW YORK AT BUFFALO (SUNYAB), School of Management, has an August 2001 opening for an Assistant, Associate, or Full Professor of Accounting. Candidates with teaching and research interests in Managerial Accounting, demonstrated capacity to undertake scholarly research publishable in leading journals, and aptitude for quality teaching in M.B.A. and executive M.B.A. programs preferred. Teaching opportunities also available at undergraduate and Ph.D. levels. Doctorate in hand or (at the Assistant level) near completion from a reputable research university expected. Research record a requirement for senior positions. Salary and fringe benefits are competitive. Send resume, two letters of recommendation, copy of dissertation proposal and/or other research paper(s) to Professor Susan Hamlen, Department of Accounting & Law, Jacobs Management Center, State University of New York at Buffalo, Buffalo, NY 14260-4000; Fax: (716) 645-3823; Email: hamlen@acsu.buffalo.edu. SUNYAB is an Affirmative Action/Equal Opportunity Employer.

108 CENTRAL MICHIGAN UNIVERSITY invites applications for the position of School of Accounting Chairperson. The Chairperson provides leadership for the School's degree programs and related teaching, research, and professional activities. Responsibilities include budgetary decisions, coordination of AACSB re-accreditation efforts, and liaison with the professional community and alumni. The successful candidate should possess strong leadership and administrative skills, and the ability to work effectively in a shared governance environment. Qualified candidates should possess sufficient credentials to justify a senior rank appointment. These include a doctoral degree from an accredited institution, and evidence of strong teaching, research, and administrative skills. Preference will be given to individuals with appropriate professional certification and/or AACSB experience and experience with the development of 150-hour programs. The College of Business Administration and School of Accounting are AACSB-accredited. Please send letter of application, resume, and a brief statement of administrative philosophy to Dr. William Cron, Chair, School of Accounting Search Committee, College of Business Administration, Central Michigan University, Mt. Pleasant, MI 48859; Email address: william.r.cron@cmich.edu.

109 HAWAII PACIFIC UNIVERSITY invites applications for a career Assistant Professor of Accounting beginning Fall 2001. A Ph.D. in Accounting is required; additional professional credentials helpful. The position requires an ability to successfully teach topics at the undergraduate and M.B.A. levels. The successful candidate will also have an active agenda of intellectual contributions. Funding for professional development and scholarly endeavors is available. HPU is the largest independent university or college in Hawaii, with approximately 8,500 students from all 50 states and over 100 countries. The HPU web site address is www.hpu.edu. Send *curriculum vitae* to Linda Kawamura, Director of Human Resources, Hawaii Pacific University, 1166 Fort St., Suite 201, Honolulu, HI 96813. EOE.

110 SIMON FRASER UNIVERSITY, Faculty of Business Administration, invites applications for a tenure-track appointment in Financial Accounting or Managerial Accounting. Ph.D. in hand or near completion necessary. Rank: Assistant/Associate. Salary: competitive within Canada. Successful candidates will have strong research and teaching abilities with established research programs in one of the above areas and an interest in teaching at undergraduate/graduate/executive levels. Start date: September 2001 or mutually agreed upon time. Positions subject to budgetary approval. Send *curriculum vitae* and the names of three referees to Diane Lesack, Assistant to Appointments Committee Chair, Faculty of Business Administration, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia V5A 1S6 Canada; Email: lesack@sfu.ca; Fax: (604) 291-5833; Web sites: http://www.sfu.ca and http://www.bus.sfu.ca. SFU is committed to the principle of equity in employment and offers equal employment opportunities to qualified applicants. In accordance with Canadian Immigration requirements, this announcement is directed, in the first instance, to Canadian citizens and permanent residents.

111 UNIVERSITY OF TENNESSEE, KNOXVILLE is accepting applications for one full-time, tenure-track position (Assistant or Associate Professor) to begin August 1, 2001. Applicants should have a primary interest in Financial Accounting, an interest in M.B.A. education and technology applications, and relevant professional experience. A candidate for Assistant Professor should hold a doctoral degree in Accounting or expect to complete all degree requirements by Fall 2001. The candidate should demonstrate excellent teaching and research potential. A candidate for Associate Professor should hold a doctoral degree in Accounting and should demonstrate excellent achievement in teaching and research. All candidates should demonstrate a strong appreciation for issues pertaining to business and accounting practice. Review of applications will continue until position is filled. Send applications to Dr. Keith G. Stanga, Head, Department of Accounting and Business Law, CBA, University of Tennessee, Knoxville, Tennessee 37996-0560. UT Knoxville is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. Applications from minorities and women are strongly encouraged.

112 UNIVERSITY OF TENNESSEE AT CHATTANOOGA invites applications for an expected tenure-track Assistant Professor position teaching Taxation beginning Fall 2001. Candidates should have a Ph.D. or D.B.A. in Accounting or have a completion date of August 2001. Salary and benefits are AACSB-competitive. Review of applicants will begin on October 15 and continue until the position is filled. For information, contact Dr. Melanie McCoskey, University of Tennessee at Chattanooga, College of Business Administration, Dept 6206, 615 McCallie Avenue, Chattanooga, TN 37403; Phone: (423) 755-5253; Email: Melanie-McCoskey@utc.edu. The University of Tennessee at Chattanooga is an Equal Employment Opportunity, Affirmative Action, Title VI and Section 504, ADA Institution. Minority applicants are strongly encouraged to apply.

113 COLUMBIA UNIVERSITY BUSINESS SCHOOL seeks applications for faculty positions in Accounting. Rank is open. Candidates with an interest in Financial Accounting will be preferred. Qualified applicants will possess a doctoral degree (or be close to completion) and evidence a strong commitment to both teaching and research. We offer a highly supportive research environment and easy interaction with faculty in other disciplines. Salary and benefits are competitive. Please send resume and a research paper to Professor Nahum Melumad, Columbia University Business School, 610 Uris, 3022 Broadway, New York, NY 10027. Columbia University Business School is an Equal Opportunity/Affirmative Action Employer. Women and minorities are especially encouraged to apply.

114 UNIVERSITY OF ARKANSAS AT LITTLE ROCK is now accepting applications for a tenure-track position at the Assistant or Associate Professor level in Accounting. The primary teaching responsibilities will be Accounting Information Systems. The secondary teaching responsibility will be Financial Accounting. An earned doctorate in Accounting is required. Professional certification highly desirable. Experience in and/or aptitude for Web-based or online teaching a plus. UALR is an AACSB-accredited metropolitan university that offers a competitive salary. The primary mission of the University and the College of Business is teaching, but an appropriate level of research and service is required. Send a current resume and list of references to Dr. Jeffrey L. Hamm, Chair, Department of Accounting, College of Business Administration, University of Arkansas at Little Rock, 2801 South University Avenue, Little Rock, AR 72204; Phone: (501) 569-3351; Email: jlhamm@ualr.edu. University of Arkansas at Little Rock is an Affirmative Action Equal Opportunity Employer. All applications are subject to disclosure. Must have proof of legal authority to work in the United States.

115 DUKE UNIVERSITY, the Fuqua School of Business, is seeking highly qualified Accounting faculty at all levels. The qualifications required include a demonstrated interest in and capacity to do publishable research, and a high level of teaching competence in M.B.A. and Ph.D. classes. Candidates are expected to hold a doctorate degree or be near completion of the degree. Rank and salary depend on qualifications. For more information, see our recruiting web site at http://faculty.fuqua.duke.edu/recruiting. Send resume and a list of references to Professor Katherine Schipper, Fuqua School of Business, Box 90120, Duke University, Durham, North Carolina 27708. Duke University is an Affirmative Action/Equal Opportunity Employer.

116 STANFORD UNIVERSITY, Graduate School of Business, invites applications for Assistant Professor positions in Accounting effective September 2001. We seek nontenured candidates interested in Financial Accounting, Managerial Accounting, Tax, and other areas that will add to our research and teaching portfolio. Candidates must have a Ph.D. or a dissertation in process, and a high level of accomplishment or promise in both scholarly research and graduate-level (M.B.A. and Ph.D.) teaching. Applications should include *curriculum vitae*, copies of research publications, and three confidential letters of reference. Applications must be forwarded in their entirety to the Faculty Recruiting Coordinator, Box A, Graduate School of Business, Stanford University, Stanford, CA 94305-5015. Deadline for receipt of materials is January 15, 2001. Stanford University is an Equal Opportunity Employer and particularly seeks applications from women and ethnic minorities.

117 NORTH DAKOTA STATE UNIVERSITY, College of Business Administration, invites applications for two tenure-track positions in the Department of Accounting Information Systems beginning January or August 2001. Rank is open depending upon qualifications. Preferred areas of teaching and research are Internal Auditing, Forensic Accounting, and External Auditing; individuals with primary interest in other areas of Accounting will also be considered. Minimum qualifications: Ph.D. or D.B.A. in Accounting with research and teaching potential, (ABD will be considered if applicant is close to completion), good interpersonal skills, demonstrated effective written and verbal communications skills. Preferred qualifications: a significant record of publications, teaching experience, and excellent teaching evaluations. Application deadline is 11/1/00 or until filled. Please send letter of application, *curriculum vitae*, transcripts, teaching evaluations, and three letters of reference to Dr. Chuck Harter, Chair, Accounting & Information Systems, NDSU, PO Box 5075, Fargo, ND 58105-5075. NDSU is an EOI.

118 UNIVERSITY OF NEW ORLEANS invites applications for an Assistant Professor position for Fall 2001. Preference will be given to those with a teaching and research interest in Taxation. Candidates must have the Ph.D. with an Accounting major (or ABD with completion of the Ph.D. by the end of 2001). Salary is negotiable and competitive. The Department offers the undergraduate Accounting degree (over 500 majors) and two Master's degrees (including a separate MS-Tax Option degree). The Department has separate AACSB Accounting accreditation at both the graduate and undergraduate levels. Candidates should send a resume to Professor Philip J. Harmelink, Chairman, Department of Accounting, College of Business Administration, University of New Orleans, New Orleans, LA 70148. The University of New Orleans is a member of the Louisiana State University System and an Affirmative Action/Equal Opportunity Employer.

119 UNIVERSITY OF WINDSOR invites applications for two tenure-track positions in the Odette School of Business in the area of Accounting at the rank of Assistant Professor commencing July 1, 2001. Candidates must have completed, or be near completion of, a doctorate in Accounting by the date of the appointment, and have a teaching interest and background in Auditing and/or advanced Financial Accounting. The successful candidates must demonstrate a record of, or show potential for, excellence in teaching and research and will teach in both the undergraduate and graduate programs. Applications from international candidates will be considered. Please view the full advertisement at http://www.uwindsor.ca/facultypositions. For additional information about this position and employment at the University of Windsor, contact Dr. Janice Drakich, Director, Faculty Recruitment at (877) 665-6608 or recruit@uwindsor.ca. Complete applications should be submitted by February 15, 2001. The University of Windsor is committed to employment equity and welcomes applications from Aboriginal peoples, persons with disabilities, and members of visible minority groups. Applications from women are particularly encouraged. In accordance with Canadian Immigration regulations priority will be given to Canadian citizens and permanent residents in Canada.

120 UNIVERSITY OF KENTUCKY, the Douglas J. Von Allmen School of Accountancy, invites applications for the Director of the School and the PricewaterhouseCoopers Professorship of Accounting. The successful candidate will be a highly productive scholar. Prior administrative experience is highly desirable. The individual will lead the development of nationally recognized undergraduate and graduate programs and will guide a major increase in faculty research. The Director will have budgetary authority over all funds designated for the School, including private endowments of over $11 million. The Director will also be involved in the University's capital campaign. The candidate must meet the criteria for appointment to the level of Full Professor with tenure. The search will continue until the position is filled. Contact Professor Paul Jarley, Director, Center for Labor Education and Research, Carol Martin Gatton College of Business and Economics, University of Kentucky, Lexington, KY 40506-0034. Email: pjarl2@pop.uky.edu; Phone: (859) 257-7692; Fax: (859) 257-4822. The University of Kentucky is an Equal Opportunity Employer and encourages applications from minorities and women.

121 STATE UNIVERSITY OF NEW YORK AT PLATTSBURGH invites applications for tenure-track positions for Spring or Fall 2001 at the Assistant or Associate Professor level. Applicants at the Assistant level must have a doctoral degree (or near completion) in Accounting. Applicants at the Associate level must have an earned doctorate in Accounting, a record of recently published research, and minimum of three years' teaching experience. CPA and other certifications are desired. Responsibilities: a commitment to teaching excellence; understanding of and sensitivity to minority and gender concerns; teaching responsibility open to all areas of Accounting, Auditing, Information Systems, and Taxation; scholarly activity is required. Review of applications will continue until position is filled. Please send letter of application, *curriculum vitae*, names, and addresses of three references to Chair, Accounting Search Committee (PJ # 2464-5717), c/o Human Resources Office, State University of New York at Plattsburgh, 101 Broad Street, Plattsburgh, NY 12901-2681. Fax: (518) 564-5060. Plattsburgh State University is an Affirmative Action/Equal Opportunity Employer. Applications from women and minority candidates are especially welcome.

122 WILFRID LAURIER UNIVERSITY is seeking to fill one or more tenure-track positions in Accounting starting July 1, 2001 with teaching responsibilities in Canadian Tax, Auditing, and/or Financial Accounting. The position requires a Ph.D. (ABD considered). Although Laurier is a relatively small university, the School of Business and Economics is one of the largest business schools in Canada. The School offers a wide array of degree, diploma, and executive programs in both business subject areas and in economics. The Accounting area has 16 full-time faculty members and values excellence in both teaching and research. The University is located in an outstanding mid-sized community, which is close to Toronto. For additional information, visit the academic postings on our web site at www.wlu.ca. Please direct applications to Dr. Bill Banks, Area Coordinator (Accounting), School of Business and Economics, Wilfrid Laurier University, Waterloo, Ontario, N2L 3C5 Canada. Email: wbanks@wlu.ca.

123 UNIVERSITY OF KENTUCKY, Douglas J. VonAllmen School of Accountancy, invites applications for an anticipated faculty opening at the Assistant Professor level, beginning Fall 2001. Applicants should have teaching and research emphasis in Information Systems. The position requires a Ph.D. in Accounting. Applicants who have defended a dissertation proposal and will be able to make a final dissertation defense by Summer 2001 will be considered. Send application, including dissertation proposal or working paper, and *curriculum vitae* to Myrtle W. Clark, Acting Director, Douglas J. VonAllmen School of Accountancy, Gatton College of Business and Economics, University of Kentucky, Lexington, Kentucky 40506-0034; Phone: (859) 257-1435; Fax: (859) 257-3654; Email: cmyrtle@pop.uky.edu.

124 CASE WESTERN RESERVE UNIVERSITY, Weatherhead School of Management, invites applications for an Assistant or Associate Professor of Accounting position. Required qualifications include a doctorate in Accounting or a related area, and a strong record of potential scholarship and quality teaching. Candidates with a specialization in any Accounting area are invited to apply. The successful candidate will provide leadership for both the undergraduate and graduate programs in Accounting and should have a strong commitment to working with the professional community. CWRU currently offers undergraduate and master's level degree programs including a B.S. in Accounting and a Master of Accountancy. In addition, faculty are heavily involved in M.B.A. program teaching and the supervision of doctoral students. All programs are AACSB-accredited. Additional information can be found at http://weatherhead.cwru.edu. Send *curriculum vitae* to Tim Fogarty, Department of Accountancy, Weatherhead School of Management, Case Western Reserve University, Cleveland, OH 44106-7235. Email: tjf@po.cwru.edu. CWRU is an Affirmative Action/Equal Opportunity Employer.

125 THE GEORGE WASHINGTON UNIVERSITY, School of Business and Public Management, Department of Accountancy, invites applications for nontenure-track/visiting positions. Rank is open. A relevant doctoral degree is preferred. The successful candidate is likely to have a strong potential or demonstrated commitment to teaching excellence and scholarly research, and/or distinguished professional career. Please send a letter of application, a current resume, faculty recommendation letters, and evidence of research to Professor Frederick W. Lindahl, Chair, Department of Accountancy, School of Business and Public Management, The George Washington University, Washington, D.C. 20052. Review of applications will begin January 1, 2001 and continue until the positions are filled. The George Washington University is an Equal Opportunity/Affirmative Action Employer.

126 MIDDLE TENNESSEE STATE UNIVERSITY, Department of Accounting, invites applications for a tenure-track faculty position (number 110090) at the Assistant/Associate Professor rank, beginning August 2001. Candidates should possess an earned doctorate (or be near completion of all degree requirements) in Accounting or a related area. Preference will be given to candidates with a primary interest in teaching Tax. Applicants should have a strong commitment to excellence in teaching, research and publication, and service. The Department of Accounting offers an undergraduate degree in Accounting, an M.S. degree in Accounting/Information Systems, and supports the Accounting concentration in the M.B.A. program. Review of applications will begin November 1, and will continue until positions are filled. Submit application letter, resume, transcripts, and three letters of reference to Dr. Paula B. Thomas, Search Committee Chair, MTSU Box 50, Murfreesboro, TN 37132. Middle Tennessee State University is an EO/AA/AOA/Employer.

127 SOUTHERN CONNECTICUT STATE UNIVERSITY, Accounting Department, invites applications for a tenure-track faculty position. Appointment would be at the rank of Professor, Associate, or Assistant Professor, depending upon qualifications and experience. Anticipated starting date is Fall 2001. *Responsibilities*: graduate and undergraduate teaching and participating in preparation for national accreditation for the School of Business and in professional growth and scholarly research. *Qualifications*: Ph.D. or D.B.A. in Accounting from an AACSB-accredited institution, or ABD nearing completion. Teaching/industry experience, professional certification, and recent scholarly research and publication are preferred. All areas of specialization are considered. Screening begins January 15, 2001 and continues until the position is filled. Candidates should include a letter of application, current *curriculum vitae*, and names of three references. Please submit the material to Dr. Carey C. Curtis, Chair, Search Committee, Department of Accounting, Southern Connecticut State University, 501 Crescent Street, New Haven, CT 06515. SCSU is an Affirmative Action/Equal Opportunity Employer and strongly encourages women and minority group members to apply.

128 UNIVERSITY OF SOUTHERN CALIFORNIA, Leventhal School of Accounting, is seeking candidates to fill tenure-track positions at the Assistant, Associate, or Full Professor levels for Fall 2001. Candidates for Assistant Professor should have a doctorate in hand or be near completion of the dissertation. All candidates should have a strong commitment to scholarly research and excellent teaching ability. Please contact Kenneth A. Merchant, Dean, Leventhal School of Accounting, University of Southern California, Los Angeles, CA 90089-0441. The University of Southern California is an Equal Opportunity/Affirmative Action Employer; applications are encouraged from women and minority candidates.

129 UNIVERSITY OF SOUTHERN MISSISSIPPI, Gulf Coast, Division of Business Administration, seeks applicants for a tenure-track position in Accounting, beginning Fall 2001, with teaching responsibilities in Tax and Financial Accounting. Position qualifications include a Ph.D. in Accounting and a CPA. The University of Southern Mississippi, Gulf Coast is part of a dual-campus system with a main campus in Hattiesburg, serves two metropolitan statistical areas, and is AACSB-accredited. Applications should include *curriculum vitae*, evidence of teaching and research effectiveness, a photocopy of doctoral transcript, and three letters of recommendation. Applications will be accepted until November 17, 2000, or until the position is filled. Contact Walt Taylor, Chair, USMGC–DBA, 730 E. Beach Blvd., Long Beach, MS 39560; Fax: (228) 865-4588; Email: w.taylor@usm.edu. AA/EOE/ADAI.

130 TEXAS TECH UNIVERSITY invites applications for permanent faculty positions in Financial Accounting or Taxation beginning Fall 2001. Positions available at the Assistant or Associate level. Doctorate, graduate instruction, program development, and significant published research required for Associate rank. Certification desirable. Applications will be considered until positions are filled. Apply to Professor Donald K. Clancy, College of Business Administration, Texas Tech University, PO Box 42101, Lubbock, TX 79409; Email: clancy@ba.ttu.edu; Fax: (806) 742-3182. Positions described further at http://accounting.ba.ttu.edu/positions. Affirmative Action/Equal Opportunity Employer.

131 Dr. Gary Saunders, Professor of Accounting, with a D.B.A. and CPA, at an AACSB-accredited regional university desires position as Visiting Professor in the Fall 2001. Position may be in the U.S. or in a foreign country and a longer term, more permanent position is possible. Research includes 30 plus articles, more than 30 presentations at academic conferences, and two simulation textbooks. Over 25 years of teaching experience at both the undergraduate and graduate level in Managerial, Cost, Systems, and Financial Accounting, including supervision of two doctoral dissertations. *Curriculum vitae* may be viewed at http://teach2k.com or will be provided upon request. Email address is saunderg@marshall.edu.

132 UNIVERSITY OF NORTH TEXAS invites applications for a tenure-track position, beginning Fall 2001, at the Assistant rank from individuals with a primary teaching/research interest in Managerial Accounting and (preferably) a secondary interest in Systems. Doctorate in Accounting or completion of the requirements by the Fall employment date is required. The University of North Texas, located in the Dallas-Fort Worth Metroplex, is a metropolitan research university with an enrollment in excess of 26,000 students. Accounting programs are offered at the undergraduate, master's, and doctoral levels. Applications will be considered until position is filled. Candidates should submit a letter of application, *curriculum vitae,* defended dissertation proposal or published article, and the names, addresses, and telephone numbers of four references to Dr. K. K. Raman, Chair Department of Accounting Search Committee, College of Business, University of North Texas, PO Box 305219, Denton, TX 76203-5219. The University of North Texas is an ADA/AA/EOE that encourages applications from minority group members and women.

133 CALIFORNIA STATE UNIVERSITY, CHICO, Department of Accounting and MIS, invites applications for a position in Accounting Systems, to begin in Fall 2001 at the Assistant, Associate, or Professor rank. The salary range is $60,000 to $95,000 depending on education and experience. The successful candidate will have a Ph.D. in Accounting or ABD, relevant systems coursework, recent industry experience, demonstrated teaching excellence. Teaching responsibilities include Accounting Systems and ERP (using SAP software) Accounting classes. Additional information about the position is available at http://www.cob.csuchico.edu/PROGRAMS/PAGES/deptaccmis.html. Review of application materials will begin November 17, 2000. Applications received after that date may be considered. Interested candidates should submit the following: application letter; resume; names, addresses, and phone numbers of three references; formal teaching evaluations; and a copy of a recent scholarly paper. Submit to Dr. Steve Adams, Department of Accounting and MIS, California State University, Chico, Chico, CA 95929-0011; Phone: (530) 898-6463; Email: Sjadams@csuchico.edu.

134 METROPOLITAN STATE COLLEGE OF DENVER is accepting applications for Accounting Faculty positions. Required qualifications: Expertise is needed in the areas of Cost/Managerial, Tax, Systems, and/or Auditing. An ABD doctoral candidate in Accounting with proof that the dissertation topic has been approved may be considered. Other doctoral degrees may be considered if the applicant has an academic record in Accounting including at least one refereed publication in the last three years, and college-level teaching experience in the field in the last three years. Applicants must meet current AACSB guidelines for academic qualification. Preferred qualifications: Applicants with a Business Doctorate from an AACSB-accredited institution. Those with a record of excellence in teaching, intellectual contributions, service, and experience with diverse groups are desired; also those with relevant professional certification (CPA, CMA, CISA, CIA); for Auditing, an active Colorado CPA license (or commitment to acquire a Colorado CPA license). For application instructions, contact Dr. Larry Lombard, Department of Accounting, Campus Box 80, Metropolitan State College of Denver, PO Box 173362 Denver, CO 80217-3362.

135 UNIVERSITY OF IDAHO, Department of Accounting, seeks applicants for tenure-track faculty appointment as Assistant or Associate Professor of Accounting beginning Fall 2001. Teaching emphasis is in Financial or Managerial Accounting. Salary depends on qualifications and experience. Ph.D. or D.B.A. in Accounting and demonstrated interest and/or record of teaching, research, and service accomplishments required. Professional certification desired. ABDs will be considered. Applications should include a complete resume, a graduate studies transcript, teaching evaluations, and letters from three professional references. Contact Marla Kraut, Department of Accounting, University of Idaho, PO Box 443169, Moscow, ID 83844-3169; Phone: (208) 885-6453. Screening will begin immediately, open until filled. AA/EOE.

136 THE PRINCIPAL FINANCIAL GROUP®, a recognized leader in insurance and financial services, has immediate opportunities for tax attorneys with experience in residential mortgage banking, intellectual property law, procurement contracts, and tax law. One position will provide tax advice to member companies of the Principal Financial Group. Requirements include a minimum of five years' experience in corporate tax; CPA and/or public company experience preferred. We offer a competitive total compensation package along with a comprehensive benefits program. Send your resume and cover letter to Principal Financial Group, HR Employment–WAAA1804, Des Moines, IA 50392-0550; Fax: (515) 247-5874 or (800) 388-4740; Web Site: http://www.principal.com/. EEO/AA Employer.

137 NORTH CAROLINA A&T STATE UNIVERSITY, Department of Accounting, School of Business and Economics, invites applications for two (2) tenure-track positions at the Assistant/Associate level beginning August 2001. Teaching requirements relate to courses in Taxation or Managerial Accounting. Applicants should have a Ph.D. in Accounting (ABDs nearing completion will be considered). Professional certifications are highly desirable. Applicants should have a strong commitment to teaching, research, and service. The School of Business and Economics pursues a mission providing high-quality management education, with a strong emphasis on fostering an effective teaching and learning environment. The Business and Accounting programs are AACSB-accredited. Send letter of interest, *curriculum vitae*, and three letters of reference to Dr. Mark Kiel, Department of Accounting, School of Business and Economics, North Carolina A&T State University, Greensboro, NC 27411. North Carolina A&T State University is an Equal Opportunity/Affirmative Action Employer.

138 RUTGERS UNIVERSITY, the Department of Accounting and Information Systems based in Newark and New Brunswick, NJ, invites applications for appointment to the William J. Von Minden Endowed Chair in Accounting in the Fall 2001 semester. Rutgers is a member of the American Association of Universities and its Business and Accounting programs have both been accredited by the AACSB. The ideal candidate for this post should be an outstanding scholar with an extensive and continuous record of publication in top-tier academic journals. Review of candidates will begin on February 1, 2001 and will continue until the position is filled. Applicants should include a resume, three letters of recommendation, and copies of publications. Applications should be addressed to Paul Miranti, Associate Dean for Faculty and Research, Rutgers University Faculty of Management, Von Minden Chair Search, 111 Washington Street, Newark, NJ 07102-3027. More detail on this post may be found at http://www.business.rutgers.edu/vmc.htm. Rutgers is an Affirmative Action/Equal Opportunity Employer.

139 NORTHERN MICHIGAN UNIVERSITY invites applications for a tenure-track Assistant/Associate Professor of Accounting position beginning January or August 2001 in the areas of Auditing, Accounting Principles, and one or more of the following: Accounting Information Systems, Managerial Accounting, Cost Accounting, Non-Profit Enterprise Accounting. Scholarship, advising, program development, outcomes assessment, and service activities are required. The College of Business is in AACSB-candidacy status; publications are expected. Ph.D. is preferred; ABD considered for instructor level with later appointment to Assistant. Associate Professor level must have appropriate record of teaching and intellectual contributions. CPA, CMA, CFP, industry or teaching experience are highly desirable. Screening begins immediately and continues until position is filled. Please send current *curriculum vitae*, official transcripts, and three references to Dr. Marge Sklar, College of Business, Northern Michigan University, Marquette, MI 49855-5359. In compliance with the Jeanne Clery Act, crime statistics for Northern Michigan University may be obtained through the Campus Security Policy and Crime Statistics at http://publicsafety.nmu.edu/clery.htm. NMU is an Equal Opportunity/Affirmative Action Employer strongly committed to increasing the diversity of its faculty.

140 UNIVERSITY OF NORTHERN COLORADO, Kenneth W. Monfort College of Business, invites applications for the position of Assistant or Associate Professor of Accounting. We are searching for candidates who have a specialty in one of the following areas and who can also teach in one other of these areas: Income Taxes, Financial Accounting, AIS, or Auditing. The qualifications require that the candidates complete all requirements of a Ph.D. or D.B.A. degree in Accounting from a regionally accredited institution by the position starting date, which is August 1, 2001. The search begins immediately and will continue until the position is filled. Candidates must be committed to scholarly and professional research, effective teaching, and university and community service. Candidates should apply to Professor Terri Gutierrez, Kenneth W. Monfort College of Business, University of Northern Colorado, Campus Box 128, Greeley, CO 80639. UNC is an Affirmative Action/Equal Opportunity Employer.

141 UNIVERSITY OF MICHIGAN–FLINT seeks qualified applicants for a tenure-track position to teach Managerial or Tax Accounting beginning Fall 2001. Candidates should possess an earned doctorate in Accounting and a record of successful teaching. Salary and rank will depend upon qualifications. The University of Michigan–Flint enrolls approximately 6,500 students at its modern riverfront campus in downtown Flint. Over half the students are employed full-time and take evening courses, so some evening teaching is expected in both Flint and Lansing. UM–Flint's Business programs are accredited by AACSB. Applicants should submit a resume, sample of professional writing, plus at least three references to Dr. Barbara Waddington, School of Management, UM–Flint, 346 French Hall, Flint, Michigan, 48502-1950; Voicemail: (810) 762-3266; Email: bwadding@flint.umich.edu. Review of applications will begin December 1, 2000 and continue until the position is filled. Appointment is contingent upon availability of funds. University of Michigan–Flint is an Equal Opportunity/Affirmative Action Institution.

142 CORNERSTONE RESEARCH, an economic consulting firm specializing in analyzing economic, financial, accounting, and marketing issues, is interested in hiring full-time and summer associates for its offices in Menlo Park, CA, Boston, MA, and New York, NY. Associates work directly with esteemed faculty experts in a distinctive partnership that combines the strengths of the academic and business worlds. We seek Ph.D. candidates with the ability to apply academic research to real-world issues, present concise explanations of complex analyses, and independently manage projects and junior staff. The ideal candidate will possess a strong empirical background in Financial, Cost, or Managerial Accounting, as well as demonstrate excellent interpersonal skills. We are also seeking experienced candidates for more senior levels. Compensation commensurate with experience. Send cover letter that includes a statement describing your interest in economic consulting and your location preferences, resume, and two letters of reference. Contact Associate Recruiting Coordinator–AR, Cornerstone Research, 1000 El Camino Real, Menlo Park, CA 94025; Web Site: http://www.cornerstone.com. Cornerstone Research is an Equal Opportunity Employer.

143 UNIVERSITY OF MIAMI, Department of Accounting, is seeking an applicant at the Assistant Professor level (although a candidate at the Associate Professor may also be considered) for a tenure-track position beginning in August 2001. The individual will be expected to teach a regular teaching load at both the undergraduate and graduate levels. Particular areas of interest include Cost/Managerial Accounting, Information Systems, and Financial Accounting. Additionally, the individual will be expected to conduct and publish significant research in his/her area of interest—focusing particularly on significant journals in the Accounting literature. Candidates should have a Ph.D. or equivalent, and relevant professional certification is desirable. Interested candidates should contact Dr. Oscar Holzmann, Chair of the Faculty Recruiting Committee, either by mail or email: Dr. Oscar Holzmann, Department of Accounting, 317 Jenkins Building, University of Miami, Coral Gables, FL 33146; Email: holzmann@miami.edu.

144 UNIVERSITY OF NORTH ALABAMA seeks applications and nominations for the position of Professor of Accounting and Eminent Scholar beginning Fall 2001. Responsibilities include graduate and undergraduate teaching, scholarly and professional contributions, development of academic programs in the Accounting and Business Law Department, and serving as liaison with the business community. Qualifications include earned doctorate in Accounting, record of successful teaching in higher education, and a substantial record of publishing in recognized Accounting journals. Business experience and CPA or CMA are desirable. Application screening will begin immediately. Applicants are invited to visit Job Opportunities page of UNA web site: http://www.una.edu. Submit letter of application, resume, unofficial copies of transcripts, and names, addresses, and telephone numbers of three references to Director of Human Resources and Affirmative Action, UNA Box 5043, University of North Alabama, Florence, Alabama 35632-0001. UNA is an Equal Opportunity Employer committed to achieving excellence and strength through diversity.

145 MORGAN STATE UNIVERSITY, Graves School of Business and Management, invites applications for an Assistant/Associate Professor to teach courses in Taxation and Financial/Managerial Accounting at the undergraduate and/or graduate level. Candidates for Assistant Professor should have Ph.D. or D.B.A. in Accounting with a primary emphasis in Taxation, or be near completion of dissertation, and have demonstrated potential for quality teaching and research. Candidates for Associate Professor should have a significant record of publications. Anticipated starting date: August 2001. The Graves School is accredited by AACSB at both undergraduate and graduate levels. Candidates should send letter of interest, *curriculum vitae*, and three recommendation letters to Dr. Sharon Gary Finney, Chairperson, Department of Accounting and Finance, Graves School of Business and Management, Morgan State University, Baltimore, MD 21251 or email same to sfinney@moac.morgan.edu. Morgan State University is an Affirmative Action/Equal Opportunity Employer.

146 WINONA STATE UNIVERSITY, Accounting Department, has an opening for an Assistant/Associate Professor of Accounting starting Fall 2001. Minimum qualifications include requirements for Ph.D. or DBA with a concentration in Accounting, from a school with AACSB accreditation, completed by date of hire. For a complete job description, see the Affirmative Action Office Home Page: http://www.winona.msus.edu/AffirmativeAction; email our office: affaction@vax2.winona.msus.edu; or call (507) 457-5639. Open until filled; review begins December 11. Position available pending budgetary approval. Winona State University (MnSCU) is an Equal Opportunity Educator and Employer. Women, minorities, and individuals with disabilities are encouraged to apply.

147 UNIVERSITY OF MICHIGAN Business School has several tenure-track positions available in Accounting starting in the 2001–2002 academic year. The application should include a research paper based on the candidate's dissertation, any other published or unpublished research, evidence of teaching experience (if any), and a *curriculum vitae* that includes three references. Applicants should have primary research and teaching interests in Financial Accounting or Managerial Accounting. Applications should be sent to Professor Douglas J. Skinner, University of Michigan Business School, 701 Tappan Street, Ann Arbor, MI 48109-1234. The University of Michigan offers competitive salary and fringe benefits and is an Affirmative Action/Nondiscriminatory Employer.

148 CALIFORNIA STATE UNIVERSITY, Fullerton invites applications for a possible tenure-track Accounting position for Fall 2001 in the areas of Financial Accounting and Audit, pending budget approval. Candidates must have an earned doctorate in Accounting from an accredited institution or be near completion of dissertation. Certification is desirable. The Department is seeking colleagues who are innovative teachers with strong instructional and computer skills. At the same time, we expect our faculty to have a strong ongoing commitment to research and publication in high-quality refereed journals. Both the Accounting undergraduate and graduate programs are accredited by AACSB. Application materials should be sent to Betty Chavis, Chair, Department of Accounting, PO Box 6848, California State University, Fullerton, Fullerton, CA 92834-6848. (714) 278-2225. Application review will begin immediately and continue until the position is filled. CSU, Fullerton is an Equal Opportunity Employer and seeks applications from women and ethnic minorities.

149 THE UNIVERSITY OF TEXAS–PAN AMERICAN invites applications for Full/Associate/Assistant Professor of Accounting. These three tenure-tack positions require a doctorate in Accounting, a commitment to excellence in teaching, and a strong record of ongoing scholarly publications. Experience with multinational students is desirable. Applicants for Full Professor must have experience supervising Ph.D. students. Review of applications will begin immediately; search to continue until position is filled. The University of Texas–Pan American is AACSB-accredited and offers an Accounting bachelor's degree, an M.B.A., and a Ph.D. in International Business Administration. Applications should include a cover letter stating the required qualifications, a resume, and three professional references. Please send application to Dr. David Neipert, Accounting Search Committee, College of Business Administration, The University of Texas–Pan American, Edinburg, Texas 78539. The University web site is http://www.panam.edu, and the College of Business Administration web site is http://www.coba.panam.edu. The University of Texas–Pan American is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

150 UNIVERSITY OF HAWAII AT HILO, School of Business, invites applications for two tenure-track positions as an Assistant or Associate Professor of Accounting, pending position clearance and funding. The positions will teach introductory and advanced undergraduate courses in Accounting; advise and counsel students; perform scholarly research and service as warranted. The positions require a Ph.D. or D.B.A. with major in Accounting or closely related field. Additionally, the Associate Professor requires at least five years of full-time college or university teaching at the rank of Assistant Professor or higher and an established record of teaching excellence and research publication. AACSB-competitive salary commensurate with training and experience. For complete qualifications, call Dr. Marcia Sakai at (808) 974-7400; Email: msakai@sob.uhh.hawaii.edu; or visit our web site at http://www.uhh.hawaii.edu. First review of applicants will begin January 31, 2001 and remain open until position is filled. University of Hawaii at Hilo is an EEO/AA Institution.

151 CALIFORNIA STATE UNIVERSITY, Long Beach invites applicants for tenure-track Accounting faculty positions at the Assistant Professor, Associate Professor, or Professor levels for Fall 2001. Applicants must hold a doctoral degree in Accounting and have demonstrated potential for excellence in teaching, research, curriculum development, and service contributions. Professional certification is desirable. Compensation will be competitive and be commensurate with the candidate's qualifications and experience. Applicant screening will begin on April 1, 2001 and will continue until the positions are filled. Please send a letter of application and *curriculum vitae* to David B. Davidson, Chair, Department of Accountancy, California State University, Long Beach, 1250 Bellflower Boulevard, Long Beach, CA 90840-8504. CSULB is an urban university in the California State University System. It is located three miles from the ocean in the city of Long Beach. CSULB is an Affirmative Action/Equal Opportunity Employer and has a strong commitment to the principle of diversity.

152 CHAPMAN UNIVERSITY invites applications for Dean of the George L. Argyros School of Business and Economics. Chapman is a selective, independent, comprehensive university located in Orange County, California. The School, accredited by the AACSB, has six endowed chairs. The School offers a B.S. in Business Administration, B.S. in Accounting, B.A. in Economics, M.A. and Executive M.B.A., and is well known for its economic forecasts. The position is effective Summer 2001. Salary will be competitive. Requirements include: nationally known scholar with earned doctorate in relevant field; successful administrative experience and ability to manage change in a collegial environment; successful fund-raiser and skilled in developing strong ties with the business community. Submit cover letter, *curriculum vitae,* and five references with addresses and telephone numbers to Dr. Ham Shirvani, Provost and Executive Vice President, Chapman University, One University Drive, Orange, CA 92866. Application review begins immediately and continues until position filled. Chapman University values diversity and is committed to providing equal career opportunities to all individuals.

153 UNIVERSITY OF AKRON, Daverio School of Accountancy, has tenure-track positions at the Assistant/Associate/Full Professor rank starting August 2001. The ideal candidates would have primary teaching and research interest in Accounting Information Systems and/or Computer Information Systems. A doctorate degree in AIS/MIS/CIS is required. ABD students who are close to completion may be considered. Certification and ability to also teach and conduct research in another area of Accounting would be an advantage. Applicants should have excellent teaching skills, demonstrated capacity, or promise thereof, to conduct publishable research, and willingness and ability to work with the professional community. Applications will be reviewed beginning December 10, 2000, and the School will continue to accept and review applications until the positions are filled. Send a letter of interest, resume, and names/addresses/phone numbers of three references to Alvin Lieberman, Search Committee Chair, Daverio School of Accountancy, University of Akron, Akron, OH 44325-4802.

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DHAHRAN, SAUDI ARABIA

College of Industrial Management
Department of Accounting & Management Information Systems

Invitation for Accounting Faculty Applications

Our Department invites applications for all professorial ranks in Accounting. Candidates must have an earned Ph.D. or DBA with an Accounting major. Priority will be given to candidates with strength in *Accounting Information Systems, Auditing and Financial Accounting*. All applicants are expected to commitment to teaching and research excellence.

In addition to providing an environment conducive for professional life and for living a very peaceful and safe family life, KFUPM offers the following benefits:

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- Free medical and dental services provided at KFUPM Medical Center
- Termination of service benefit payable at the final termination of contract.
- Transportation allowance.
- Opportunities such as short course and summer program teaching are available to greatly supplement income.
- Annual repatriation air tickets, if needed, for the faculty member and his dependents from Dammam to point of origin.
- Free transportation within campus and to city centers.

Candidates should send visa, application letter (including e-mail address) and list of three references to:

Dr. Nassar M. Shaikh
Chairman, Dept. of Accounting & MIS
KFUPM Box 5076, DEPT. CIMA-2112
Dhahran, 31261, Saudi Arabia
E-mail: nshaikh@kfupm.edu.sa
Fax: 00966-3-860-3489

Dean, Faculty & Personnel Affairs,
King Fahd University of Petroleum & Minerals
DEPT. CIMA-2112
Dhahran, 31261, Saudi Arabia
E-Mail: faculty@kfupm.edu.sa
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(attachments in MSWord, Wordperfect, or ASCII format)**or to:**

Office of Faculty Recruitment, AR*Code****
University of Maryland University College
3501 University Boulevard East
Adelphi, MD 20783

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University of Notre Dame
Arthur Andersen Chair in Accountancy

The University of Notre Dame seeks to fill the Arthur Andersen Chair in Accountancy. Candidates should possess a distinguished research and teaching record, and a strong commitment to scholarly leadership. The individual should also possess credentials appropriate for a tenured appointment at the rank of full professor. Candidates from all accountancy research areas will be considered for appointment.

Expected responsibilities of the Arthur Andersen Chair include leadership in scholarly research and curriculum development, graduate and undergraduate teaching, and significant interaction with College of Business faculty and the professional community.

Chairs at Notre Dame are backed by major endowments. In addition, chairholders normally receive reduced teaching loads, research expense allowances, as well as other significant forms of support. Please send vita and references to

Professor Thomas Schaefer, Chairperson,
College of Business, University of Notre Dame,
Notre Dame, IN 46556-5646

The University of Notre Dame is an affirmative action, equal opportunity employer.

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Lingnan University is a liberal arts institution in Hong Kong Special Administrative Region which offers honour bachelor degrees and postgraduate programmes to doctoral level. Applications are invited for the following posts:

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Department of Accounting and Finance

Tenable from mid August 2001
(Post Ref.: 001/ACCT/2001)

Applicants should have a PhD degree in Accounting or Finance. The appointee should be able to teach in at least one of the following areas: Financial Accounting, Auditing, Taxation and Financial Statement Analysis.

Successful appointees are expected to have a strong commitment to teaching excellence, quality research and services to the Department and to the University. Rank and remuneration will be commensurate with teaching experience and research track records. For appointment as an Associate Professor, applicants should have 4-5 years of relevant experience as an Assistant Professor and should have a good track record in research and scholarly activities; for appointment as a Professor, applicants should have substantial research and teaching experience as an Associate Professor with significant scholarly publications and academic achievements.

Monthly Salary and Fringe Benefits:
(At current rates, salaries tax will not exceed 15% of gross income)

Professor	HK$74,870 - HK$99,465
Associate Professor (Scale A)	HK$71,765 - HK$96,405
Associate Professor (Scale B)	HK$61,720 - HK$77,165
Assistant Professor	HK$46,190 - HK$77,165

[approximate exchange rate US$1=HK$7.8]

Fringe benefits include gratuity, medical and dental schemes, annual leave, children's education allowances, and where appropriate, housing allowance and passage and baggage allowances for eligible appointees. The appointment will normally be made on fixed-term three-year contract which may be renewed by the University.

Application Procedure:
Applicants are invited to submit (1) a detailed curriculum vitae, and the names, addresses and fax numbers/email addresses (if available) of three referees; and (2) an application form, which is obtainable from the University's homepage at http://www.ln.edu.hk, to the **Human Resources Office, Lingnan University, Tuen Mun, Hong Kong** by post, or by fax (852)-2891-5782, or by email: recruit@ln.edu.hk. Please specify the level of appointment for which you wish to apply and quote the reference number of the post on all correspondence.

The University reserves the right not to fill the posts or to fill the posts by invitation or by search.

香港城市大學
City University
of Hong Kong

The City University of Hong Kong (CityU) is a leading university in the Asia Pacific region. CityU is located in close proximity to the hub of all business activities in Hong Kong with convenient access through the mass transit railway. The University has a student population of about 17,000 and offers excellent facilities with generous teaching and research support. CityU is committed to excellence in teaching and research as well as to maintaining close ties with commerce and industry. The medium of instruction is English given that Hong Kong has a significant role to play as an international city. The Faculty of Business is proud to be the largest business school in Hong Kong with a total of about 160 faculty members within its six academic departments. All six departments are well known in the business community for their professional standing and academic reputation.

The Department of Accountancy is one of the six departments in the Faculty of Business. It has 34 full time faculty members and 9 administrative staff. One honorary research professors, namely **Professor Ross Watts**, William H Meckling Professor of Business Administration, William E Simon Graduate School of Business Administration, University of Rochester has been appointed for a period of three years to augment our research profile. Our department provides state-of-the-art accountancy education with a professional emphasis. We offer three undergraduate programmes namely the Bachelor of Business Administration (Honours) in Accountancy, Bachelor of Business Administration (Honours) in **Accountancy and Management Information Systems**, Bachelor of Business Administration (Honours) in **Accountancy and Law** and three taught postgraduate programmes including Master of Arts in International Accounting, Master of Arts in Professional Accounting and Information Systems and Postgraduate Certificate in Professional Accounting (PGCPA). Our undergraduate degrees and the PGCPA have been fully accredited by the Hong Kong Society of Accountants for their new Qualification Programme.

Research is strongly and actively encouraged and we have been successful in obtaining numerous competitive research grants both within and outside the University. The Department is further strengthening its PhD programme with a focus on economic aspects of accounting and auditing and corporate governance issues, with special interest in the Chinese Mainland and the Asia-Pacific region. Research seminars with eminent professors from the top US universities have become part of our regular activities.

One of the recent developments in our Department is the establishment of an interdisciplinary ***Accounting & Corporate Law Centre***, headed by **Professor Ferdinand A Gul, Professor (Chair) of Accounting**. The mission of this Centre is to identify key issues and problems and undertake collaborative research in the areas of Accountancy and Corporate Law to provide solutions and prescriptions for policy makers in Hong Kong, the Chinese Mainland and the region. It has established links with academic institutions in the United States, United Kingdom, Canada, Australia and other countries in the region with a view to conducting comparative studies in accounting and law. The Centre publishes "The Asia Pacific Journal of Accounting & Economics (APJAE)" with Professor Ferdinand A Gul and Professor Dan Simunic as Co-editors and Professor Katherine Schipper and Professor Ross Watts as consulting editors. Our excellent track record in internationally refereed publications such as ***The Accounting Review, Journal of Accounting and Economics, Contemporary Accounting Research, Accounting, Organizations and Society, Auditing: A Journal of Practice and Theory, Journal of Corporate Finance*** are evidence of our research strength. The University has already committed US$1,000,000 in the Centre for funding research projects. Our current research projects address significant corporate governance issues in the HKSAR, Chinese Mainland and the region.

Posts and Subject Areas

The Department is now inviting applications for the positions of **Professor/Associate Professor/Assistant Professor tenable from January/September 2001**. The appointees will teach in one or more of the following areas: Financial Accounting / Accounting Information Systems / Auditing / International Accounting. Preference will be given to those with research and teaching interests in international and economic dimensions of financial accounting, auditing and the application of information technology to all areas of accounting. Our teaching load is normally two courses per semester. All undergraduate classes are conducted in the day time, with evening teaching for our taught postgraduate programmes. There will also be some additional undergraduate or postgraduate supervision of projects and thesis respectively.

General Requirements for Appointment

Applicants for Professor/Associate Professor should possess a **PhD**, a solid publication record in good international journals and a dedication to quality teaching. They are expected to provide contribution/leadership in research, plan curriculum of studies and supervise postgraduate students. They are required to have relevant teaching, and preference will be given to those with professional qualifications and research experience with a record of publications. Applicants for Assistant Professor should possess a PhD.

Salary* and Conditions of Service

Professor	approx. US$115,000 - $153,000 per annum
Associate Professor	approx. US$110,000 - $148,000 per annum
Assistant Professor**	approx. US$71,000 - $119,000 per annum

**Appointees at the level of Assistant Professor with salary at US$100,000 per annum or above may be considered for the title of Associate Professor.

*Standard income tax rate is 15%.

Appointment will be either on a two/three-year contract with gratuity at approximately 15% of basic salary payable upon satisfactory completion of the contract or on superannuable terms with an initial evaluation period of 3 years. Excellent fringe benefits include housing allowance, medical and dental schemes, 46 days' annual leave, passages where applicable.

Information and Application

Information concerning the post and the University is available on the University's World Wide Web home page http://www.cityu.edu.hk or the University's listserver accessed by E-mail at "hrmail@ctylnk.cityu.edu.hk" or from the Human Resources Office, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong (Fax : (852) 2788 1154 or 2788 9334 / E-mail : hrrecruit@cityu.edu.hk). Further information can be obtained from Professor Judy Tsui, Head of Department of Accountancy at Personal Fax No. (852) 2788 7002 or E-mail : acjng@cityu.edu.hk. Please send your application in the form of an application letter enclosing a current curriculum vitae and the names and addresses of three academic referees to the Human Resources Office.

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

The Department of Accounting and Information Systems of the Faculty of Management at Rutgers-The State University of New Jersey invites nominations and applications for the William J. Von Minden Endowed Chair in Accounting.

The William J. Von Minden Chair was established through the generosity of many devoted alumni of the Accounting and Information System's MBA Program in Professional Accounting to honor the memory of the late Professor William J. Von Minden, a pioneer in the development of professional accounting education. Appointment to the Von Minden Chair will be effective during the fall semester 2001.

Rutgers University is a member of the American Association of Universities. Its Faculty of Management, based in Newark and New Brunswick, N.J., has been accredited by the AACSB. The Department of Accounting and Information Systems has also received separate AACSB accreditation for its programs in accounting. The Department provides instruction at the bachelors, masters and doctoral levels and, besides its MBA in professional accounting program, also sponsors specialized masters training in governmental accounting and taxation. Although the Department's primary focus of teaching is in Newark and New Brunswick and several satellite locations throughout the state, teaching opportunities are also possible in the Faculty's offshore executive MBA programs in Singapore and Beijing.

The ideal candidate should be an outstanding scholar with an extensive and continuous record of publication in top-tier academic journals. The candidate would be expected to play a leading role in enhancing the quality of accounting doctoral studies and in guiding junior faculty in the development of successful research programs. The candidate is also expected to play a leading role in professional and academic association affairs and to support the Department's efforts to maintain close, cooperative relationships with local professional and business organizations. Although competency in no specific sub-specialization has been mandated for this post, the Department has established research and teaching strengths in accounting information systems, financial accounting, governmental and not-for-profit accounting, managerial accounting and taxation.

Review of candidates for the William J. Von Minden Chair will begin on February 1, 2001 and will continue until the position is filled. Applicants should include a recent resume, three letters of recommendation, copies of publications and current working papers, and descriptions of courses taught. Applications and nominations should be addressed to:

Paul J. Miranti
Associate Dean for Faculty and Research
Rutgers University Faculty of Management
Von Minden Chair Search
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Rutgers University is an Affirmative Action, Equal Opportunity employer. Women and minority group members are invited and encouraged to apply.

THE ACCOUNTING REVIEW
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VOLUME 76, No. 2 APRIL 2001

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The Accounting Review (ISSN 0001-4826) is published four times a year in January, April, July, and October by the American Accounting Association, 5717 Bessie Drive, Sarasota, Florida 34233-2399. General subscriptions are available at the annual rate of U.S. $140; membership subscription rate is $25 with discounts available; and emeritus subscription rate is $8.75. Periodical postage paid at Sarasota, Florida and additional mailing offices. **POSTMASTER:** Send address change to ***The Accounting Review,*** 5717 Bessie Drive, Sarasota, Florida 34233-2399.

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THE ACCOUNTING REVIEW

A QUARTERLY JOURNAL OF THE

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The purpose of the conference is to provide fresh insights into questions of how incentives, judgments, and expertise combine with accounting and auditing standards and securities regulations to affect the quality of reported earnings, and, where possible, to develop the implications of those insights for the key constituencies of financial reporting. The conference will include research on earnings quality and earnings management, broadly construed. Papers using analytical, empirical-archival, experimental, and field study approaches will be considered. Research topics appropriate for this conference include any topic that is consistent with the purpose of the conference. Examples of such topics include, but are not limited to, the following:

1. What are the observable and quantifiable characteristics of higher (or lower) quality earnings? Can specific practices (judgments, estimations, accounting policies, or procedures) be identified that systematically increase or decrease earnings quality?
2. To what extent is earnings quality determined by the applicable financial-reporting standards and to what extent is it determined by how the standards are implemented? What are the implications for both domestic and international standard setting, auditing/assurance, and enforcement?
3. To the extent managers can increase or decrease the quality of reported earnings, what incentives (e.g., from the tax system, from the capital markets, from compensation schemes) do they face to do so? What are the related implications for corporate governance arrangements (e.g., audit committee responsibilities)?
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6. Do the activities of information intermediaries such as sell-side and buy-side analysts and investment bankers affect earnings quality?
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THE ACCOUNTING REVIEW
Vol. 76, No. 2
April 2001
pp. 171–198

Estimating the Hidden Costs of Environmental Regulation

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ABSTRACT: This paper examines the extent to which accounting systems separately identify all the costs of environmental regulation. We estimate the relation between the "visible" costs of regulatory compliance (costs that firms' accounting systems correctly classify as "environmental") and "hidden" environmental costs embedded in other accounts. We use plant-level data from 55 steel mills to estimate hidden costs, and we follow up with structured interviews of corporate-level managers and plant-level accountants. Empirical results show that a $1 increase in the visible cost of environmental regulation is associated with an increase in total cost (at the margin) of $10–$11, of which $9–$10 are hidden in other accounts. The findings suggest that inappropriate identification and accumulation of the costs of environmental compliance are likely to distort costs in firms subject to environmental regulation.

Keywords: *costing systems; hidden costs; environmental regulation; environmental management.*

Data Availability: *A confidentiality agreement with the Center for Economic Studies and U.S. Census Bureau precludes us from disseminating the data or identifying the firms.*

Research results and conclusions expressed are those of the authors and do not indicate concurrence by the U.S. Census Bureau or the Center for Economic Studies. We thank the staff at the Center for Economic Studies for their support. Financial support for this research was provided by the Alfred P. Sloan Foundation. We thank Ken Cavalluzzo, Elizabeth Connors, Mark Epstein, Joan Luft, Francis McMichael, Nandu Nagarajan, Kathy Petroni, Mike Shields, Jhih-Shyang Shih, and workshop participants at the 2000 Annual Meeting of the American Accounting Association, 1999 Big 10+ Accounting Research Conference, Carnegie Mellon University, and Georgetown University for their comments. We also thank two anonymous referees for their advice. We are grateful to the managers of the steel firms who participated in our study.

Submitted November 1999
Accepted November 2000

I. INTRODUCTION

Compliance with stringent environmental regulations can significantly affect product costs in industries such as chemicals, paper, steel, and utilities. This paper examines how environmental regulations affect product cost in the U.S. steel industry. The steel industry suffered a major decline from 1974 to 1995, with production falling by 58 percent. The industry blamed environmental regulations as a major reason for the decline.[1] However the reported costs of environmental compliance constituted less than 5 percent of the cost of steel making, raising the question whether the reported environmental costs reflect the full impact of regulations. We examine the extent to which the accounting records separately isolate environmental costs, vs. the extent to which the accounting systems fail to identify "hidden" costs associated with regulation. We estimate the magnitude of these hidden costs and explore their managerial implications. Our study provides a model that managers can use to estimate marginal costs of regulation including hidden costs, and to assess cost-benefit trade-offs of developing more detailed accounting systems to identify and manage these environmental costs.

Environmental regulations affect firms' costs in several ways (White et al. 1995). Typical accounting systems easily identify, and hence separately capture and accumulate "visible" costs of environmental compliance, such as installation and maintenance of pollution-control equipment and end-of-pipe emission treatment costs. Regulations also affect costs indirectly, by imposing additional constraints on firm production technology. For example, environmental compliance may require firms to substitute less-polluting inputs for more-polluting inputs, or to change the production process to limit emissions. Accounting systems often fail to identify separately the incremental costs of such changes, and instead include them in other cost pools. These hidden costs can be quite large, distorting the costs reported by the firm's costing system.[2] Regulations can also lead to external costs to society for which firms are not currently accountable, but which may become material in the long run, such as contingent environmental liabilities for Superfund sites and toxic releases.

Prior accounting research has concluded that contingent environmental costs affect firm value (Barth and McNichols 1994; Blacconiere and Patten 1994; Blacconiere and Northcut 1997; Hughes 2000), but has generally not examined empirically whether firms' managerial accounting systems identify accurately all the internal costs of environmental regulation. Two exceptions are case studies by Epstein (1996) and World Resources Institute (Ditz et al. 1995). Epstein's (1996) subjective judgment, based on telephone interviews and site visits, is that most firms do not adequately identify and measure environmental costs. Ditz et al. (1995) use account analysis and reclassify components of product cost as environmental costs. They found substantial hidden costs of environmental regulations for select products in nine firms. However, they do not estimate the extent of hidden costs in the overall accounting system at the plant level.

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[1] For example, in the 1979 Annual Report, the CEO of U.S. Steel Corporation notes that one of the reasons for the shutdown of some operations was "unrealistic environmental control regulations," and further that "they certainly played a major cumulative role" in the shutdowns. Competition from low-cost imported steel from Japan and Korea also contributed to the decline.

[2] Hidden costs of regulation can be positive or negative. If regulations increase the cost of production, then these hidden costs will be positive. If, however, regulations lead the firm to adopt more efficient production processes, costs of production may decrease. Porter (1991) argues that more stringent environmental regulations motivate firms to re-engineer their production processes and thereby improve overall productive efficiency. Empirical research has not found that environmental regulations reduce costs. (Jaffe et al. 1995).

We draw on unique, confidential, plant-level data from 55 steel mills from 1979–1988, to study the visible and hidden costs of environmental regulations in the U.S. steel industry. We use a cost function to estimate the hidden costs of regulation. Unlike most of the accounting literature examining production costs—which assumes simpler and more restrictive forms of production technology—we use a translog cost function. The translog is a flexible functional form that does not impose *a priori* restrictions on scale economies or substitution of inputs in response to changes in relative input prices, technology, and regulation. We estimate a system of structural equations that incorporates many cost drivers, including production volume, input prices, technology, regulation, and their interactions. We develop separate estimations for (1) integrated mills, which produce steel from iron ore, and (2) mini-mills, which produce steel by recycling scrap.

The results indicate that visible environmental costs, as reported by these firms' accounting systems, identify only a minor portion of the overall costs associated with regulatory compliance. For firms in the integrated-mill sector, a $1 increase in visible environmental operating expenditure is associated with an increase of $9.23 in total cost (at the margin), of which $8.23 is hidden, and embedded in accounts other than "regulatory costs." Similarly, for firms in the mini-mill sector, an increase of $1 in visible environmental operating expenditure is associated with an increase in total cost of $10.68 (at the margin), of which $9.68 is hidden. Thus, considering only the visible costs of environmental regulation will seriously underestimate the effect of regulation on cost and profit.

We also conducted structured interviews with corporate-level executives and plant-level accountants from seven steel firms to validate our econometric estimations and to gain insight into such questions as: Are the managers aware of the large hidden costs of environmental regulation? What are the reasons for the large hidden costs? What types of decisions are large hidden costs likely to affect? We found that the managers are aware of these hidden costs, but seriously underestimate their magnitude. The managers cited several reasons why the accounting system does not identify all environmental costs: difficulty in separating the environmental portion of the incremental costs of materials, utilities, and overheads; problems of aggregation across plants and functional departments; and complexity in separating the environmental component of costs of process changes that have multiple objectives.

Our finding that the steel industry suffers from large hidden costs has implications for the design of costing systems in industries facing significant environmental regulations. Gross underestimation of hidden costs is likely to lead to suboptimal decisions in managing these costs. Hidden costs may distort variance analysis, contribute to product mispricing, and lead to inappropriate product mix, plant closure, and investment decisions. Our interviews reveal examples of these effects. We conclude that managers underestimate the magnitude of hidden costs, and that they should reconsider the costs and benefits of updating standard costing systems to better track environmental costs.

The remainder of this paper is organized as follows. Section II discusses the effects of environmental regulations on firms' costs. Section III presents the estimation model; Section IV describes the data and variables; Section V discusses the results; and Section VI concludes.

II. BACKGROUND

Visible and Hidden Costs of Environmental Regulation

The total current costs of environmental regulations are the sum of visible costs, which the accounting system identifies easily and tracks separately, and hidden costs, which the accounting system does not identify directly. Visible costs typically include costs of installing and operating equipment to treat released pollutants, for example, costs of treating and disposing of wastewater and hazardous solid waste. Most accounting systems accumulate visible costs into environmental cost pools, separate from other overhead cost pools. Our interviews revealed for example, that many steel firms compile separate cost pools for wastewater treatment, remediation, hazardous waste disposal, pollution-abatement capital expenditures, and depreciation on pollution-abatement equipment.

In addition to the visible costs of compliance, environmental regulations indirectly affect firms' costs by imposing other constraints on production processes, altering raw-material compositions, input proportions, and energy use. For example, most integrated mills changed their raw material from sinters to less-polluting pellets in response to more stringent regulation of the sintering process. Because the accounting system does not separately report the change in raw-material cost as an environmental cost, these incremental costs due to the regulatory change are hidden within material costs. Similarly, when coke-oven emission standards became very strict, steel firms reduced coke consumption by injecting natural gas and pulverized coal into their blast furnaces. As a result, firms reduced their average coke rate (i.e., tons of coke used per ton of raw steel produced) from 0.64 in 1975 to 0.45 in 1994, while increasing the use of other fuels. Many mills replaced coal with natural gas or electricity in their boilers and furnaces in response to air-quality regulations. The incremental costs of these changes are hidden under energy cost or factory-overhead costs. Firms incur additional indirect-labor costs to monitor and report emissions, and to maintain pollution-control equipment.

Environmental regulations can also increase general and administrative costs. For example, legal staff may be involved in regulatory activities such as obtaining permits, licenses, and so on. However, firms rarely report such costs as environmental costs, and instead include them in general and administrative overheads (Epstein 1996). Such hidden environmental costs cannot be completely attributed to specific transactions. Managers must use other methods to estimate hidden costs. Ditz et al. (1995) note that most firms' managerial accounting systems depend on discrete historical transactions and cost pooling, which can conceal and distort critical information on environmental and other costs.

Field studies suggest that most firms' costing systems fail to identify the full effect of regulation on cost. Epstein (1996), in an attempt to document best practices for identifying, measuring, monitoring, and managing environmental costs, studied more than 100 companies. His field study concludes that most companies lack adequate systems for measuring and managing environmental costs; they do not track or accumulate all environmental costs separately, and most environmental costs are hidden in various overhead accounts. Hence, most companies do not know the total costs of environmental regulation. However, Epstein (1996) does not provide evidence on the magnitude of hidden costs. Similarly, in a Price Waterhouse (1994) survey of 445 companies, 49 percent of the companies surveyed responded that their cost accounting systems do not identify all the costs of environmental compliance.

In 1993, the World Resource Institute conducted nine case studies exploring how firms account for environmental costs (Ditz et al. 1995). The case-study firms included Amoco Oil, Ciba-Geigy, Dow Chemical, E. I. DuPont de Nemours, and S. C. Johnson Wax. The studies are based on a review of cost and environmental information gathered through on-site interviews of corporate and plant-level personnel. The authors analyze cost data for one specific product line in each firm to illustrate environmental components in traditional product-cost categories. For example, they separate the maintenance of pollution-abatement equipment from total maintenance costs. The results indicate that total environmental cost for the selected product lines range from 2.5 percent of net sales for S. C. Johnson Wax to 22 percent of operating costs for Amoco Oil. The total environmental cost for Ciba-Geigy and DuPont amounted to 19 percent of manufacturing cost.[3] In all these firms, the the cost-accounting system identified only a portion of the total environmental cost as "environmental." Ditz et al. (1995) do not estimate the extent of hidden costs in the overall accounting system at the plant level, nor do they examine the effect of an increase in regulatory stringency on total cost.

Finally, economists have concluded that environmental regulations hurt the productivity growth rate in the steel industry (Barbera and McConnell 1990; Gray and Shadbegian 1993).[4]

Cost of Environmental Regulation in the U.S. Steel Industry

Prior to 1994, the U.S. Census Bureau collected data on environmental costs in the steel industry and other industries in the manufacturing sector, through an annual "MA-200, Pollution Abatement Costs and Expenditure (PACE) Survey." The PACE surveys contain information on pollution-abatement capital and operating expenditures classified by pollution medium (air, water, and land) and by cost categories (labor, material, capital, and energy) at the individual plant level. (The Appendix contains further details on the purpose, content, and methods of the PACE surveys.)

The PACE surveys are the most comprehensive, available estimates of firms' environmental costs. Title 13 of the U.S. Code requires firms to respond to the PACE survey and to certify that the reports are substantially accurate. The data are to be based on company's accounting records and if accounting records are not available, carefully prepared estimates are acceptable. The reporting instructions further note that some of these estimates may require the joint efforts of the firms' financial and engineering staffs. In our interviews, steel-firm managers indicated that the PACE survey data represent the best available internal cost data for environmental regulatory expenses. Managers of two large steel firms stated that they still use the PACE format to track environmental costs, although the Census Bureau no longer conducts these surveys. They also mentioned that most steel firms' environmental accounting systems are set up primarily to meet PACE reporting requirements. Furthermore, firms have no incentives to understate their environmental expenditures in PACE reports, especially when the steel industry has blamed environmental regulations for its decline.

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[3] Each company expressed aggregate environmental costs differently (e.g., as a percentage of either manufacturing costs, operating costs, or net sales), based on what managers thought was appropriate for their company/industry. As the authors acknowledge, these numbers do not allow meaningful comparisons.

[4] Barbera and McConnell (1990) use aggregate industry data for five industries, including the steel industry, to examine the impact of environmental regulation on productivity growth rate. Gray and Shadbegian (1993) analyze the relation between environmental regulations and total factor productivity (TFP) in oil-refining, paper, and steel industries, by regressing the observed TFP and TFP growth rates on various measures of environmental regulation, such as the number of pollution inspections, emission levels, and compliance costs. They conclude that the adverse effect of regulations on TFP is more than is explained by the reported compliance costs. These studies suffer from some of the following limitations: (1) use of industry aggregate data, (2) pooling of data from integrated and mini-mills, each of which employs very different technologies, (3) imposition of constant returns to scale technology, and (4) the assumption that environmental regulation does not change the elasticity of substitution between the various inputs. Our approach addresses all these limitations.

The PACE data indicate that the environmental capital expenditures for the entire U.S. steel-industry range from a low of $0.67/Short Ton (ShT) of steel produced in 1988 to a high of about $6.36/ShT in 1980 (Table 1). Environmental operating expense ranges from a low of S4.95/ShT in 1975 to a high of $13.84/ShT of steel produced in 1982. Total reported cost of environmental regulation has ranged from $8.86/ShT in 1988 to $18.94/ShT in 1980.

Although the number of environmental regulations and their stringency have increased over time, the reported cost of environmental regulations shown in Table 1 does not increase monotonically. Some of the reasons include: (1) increase in the share of U.S. raw-steel output from mini-mills (from 17 percent to 39 percent between 1973 and 1991), which have relatively low environmental costs; (2) the closure of several mills and process units (such as sintering plants, beehive coke ovens, and open-hearth furnaces) with high compliance costs; and (3) improvement in pollution-abatement technology. Furthermore, most mills could not comply immediately with many regulations (such as the Clean Air Act), and the steel firms negotiated consent decrees specifying both the time when the mill would come into compliance and the emission reductions it would achieve each year (Landy et al. 1990). Because all mills are not required to meet a specific regulation on a specific date,

TABLE 1
Reported Costs of Environmental Regulation in the U.S. Steel Industry
(in $/Short Ton)

Year	*Depreciation Expense*	*Labor Expense*	*Materials Expense*	*Services Expense*	*Total Operating Costs*	*Capital Costs*	*Total Reported Cost Per Short Ton Produced*	*Total Reported Cost Per Short Ton of Capacity*
1975	1.11	1.10	0.13	2.61	4.95	5.14	10.09	7.68
1976	1.22	1.20	0.09	3.26	5.77	5.04	10.81	8.75
1977	1.51	1.44	0.09	4.07	7.10	5.42	12.52	9.82
1978	1.71	1.64	0.28	4.15	7.78	5.01	12.79	11.10
1979	2.01	1.87	2.32	3.20	9.40	5.93	15.33	13.45
1980	2.79	2.61	3.36	3.82	12.58	6.36	18.94	13.78
1981	2.79	2.66	3.19	4.42	13.06	5.12	18.18	14.23
1982	3.76	2.73	3.20	4.15	13.84	4.17	18.01	8.71
1983	3.22	2.15	3.42	3.73	12.52	1.95	14.47	8.13
1984	2.42	1.78	3.91	2.22	10.33	1.18	11.50	7.87
1985	2.73	1.92	4.35	2.65	11.65	1.59	13.24	8.75
1986	2.69	1.73	4.02	2.26	10.70	0.97	11.67	7.44
1988	1.36	1.46	3.34	2.02	8.19	0.67	8.86	7.04
1989	1.41	1.55	3.95	2.75	9.66	1.72	11.38	10.15

Source: PACE Surveys (1975–1989).

and because each steel mill found its own way to comply with the regulations, the visible costs of regulation do not increase uniformly. Table 1 also shows that the cost/ShT of production capacity (which purges variations simply due to changes in capacity utilization) exhibits a similar pattern.[5]

The reported cost of compliance with environmental regulation shown in Table 1 represents less than 5 percent of the total cost of steel production, which is clearly insufficient to explain the crisis in the industry. However, findings from earlier accounting and economic studies (Epstein 1996; Ditz et al.1995; Barbera and McConnell 1990; Gray and Shadbegian 1993), and the claims of the steel industry that environmental regulations are a major reason for its decline, suggest that these reported costs may understate the true costs of regulation.

To study the hidden costs of regulation, we use a unique plant-level panel data set for the steel industry that draws on various confidential databases of the U.S. Census Bureau. We assume an economic model of production where firms minimize cost, subject to the chosen output level, input prices, and regulatory restrictions. We estimate translog restricted-cost functions with the visible pollution-abatement operating expenditures as an index of quasi-fixed regulatory restriction. The estimated cost-function parameters reveal the magnitude of the hidden costs of environmental regulation. We also estimate the extent of hidden costs in different cost pools. We follow up with interviews of steel-firm managers to validate the results, identify the reasons for the hidden costs, and discuss managerial implications.

III. MODEL OF PRODUCTION UNDER ENVIRONMENTAL REGULATIONS

We base our model on a standard, restricted-cost function for production. We assume that firms minimize steel production cost (C) for given input prices, output volume, technology, and regulatory stringency. That is, the cost function of steel production is of the following form:[6]

$$C = C(P_L, P_M, P_E, P_K, Y, T, R) \tag{1}$$

where P_L, P_M, P_E, and P_K are exogenously determined prices of input factors, labor, materials, energy, and capital, respectively. Y represents the firm's output. T is a time trend variable representing technological change. R represents environmental regulatory restriction, which acts as an exogenous, quasi-fixed restriction on the production technology that causes a firm to change its combination of conventional inputs to produce output.

We assume that factor markets are competitive. By the mid-1970s, steel mills had divested most of their mining operations, and strong international markets had emerged for commodities such as iron ore, ore concentrates, bituminous coal, and coke. Similarly, market prices for scrap and electricity used by mini-mills are exogenous, because the number of mini-mills and suppliers of these factors is large. We assume R is exogenous because the regulations affecting the steel industry are technology-based standards that often contain detailed specifications on the control equipment. For example, the Clean Air Act required existing plants to install abatement equipment with "reasonably available control technology," and new plants to install "lowest achievable emission-rate technology" as specified by the USEPA.

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[5] We also scrutinized the 10-K reports filed with the SEC. Only three steel firms, Bethlehem Steel Corporation, Inland Steel Corporation, and USX Corporation, occasionally reported environmental costs in their 10-K reports. The reported environmental operating costs for these companies ranged from \$2.53/ton for Inland Steel in 1979 to \$24.25/ton for USX in 1985. None reported for all the sample years.

[6] Christensen and Greene (1976) and Diewart (1974) discuss the formal properties of the cost function and its dual relationship with the production function.

The elasticity of total cost with respect to change in regulatory restriction (i.e., the percent change in total cost for a 1 percent change in the regulatory restriction) is given by the partial derivative $\partial \ln C/\partial \ln R$. Our model uses the reported, visible environmental operating expenditure per unit output as a comprehensive measure of environmental regulatory restriction, R. (Section IV details the reasons for choosing this measure). If environmental regulations have no associated hidden effects, then a $1 increase in the reported environmental costs should increase the total costs by $1. In other words, the estimated value of the regulatory elasticity, $\partial \ln C/\partial \ln R$, should equal the average share of reported environmental expenditure in total product costs. If there are hidden costs not captured by the reported environmental costs, then total costs will increase by more than $1 (i.e., the estimated $\partial \ln C/\partial \ln R$ will be larger than the share of reported environmental expenditure in total product costs). The estimated regulatory elasticity reveals the extent of hidden costs.[7]

To operationalize the model, we must choose a functional form and then estimate the cost function. Prior empirical accounting studies typically assume a simple linear relation between product cost and volume of output, input prices, and other cost drivers. For example, Banker and Johnston's (1993) study of the airline industry assumes a Leontief-type production function that does not allow substitution among inputs. They argue that a Leontief production function is justified because of limited substitution among inputs in the air-transportation-services industry. However, their model also ignores economies of scale in the determination of the overall cost.

Steel firms are likely to substitute away from inputs that become more expensive due to changes in relative prices. Steel production technology also exhibits economies of scale, making the relation between total cost and volume nonlinear. Thus, we use a translog cost function, which allows economies of scale, substitutions in response to input price changes, substitution of inputs in response to regulation (i.e., substitution toward less-polluting inputs), and interactions between inputs and output volume. The translog function is a second-order Taylor series approximation of an arbitrary cost function (Christensen et al. 1973). Translog is a flexible functional form that does not impose any *a priori* restrictions on substitution elasticities or scale economies. Simulation analyses have found that the translog cost function outperforms other flexible functional forms in approximating real underlying production technology (Guilkey et al. 1983). We also improve the efficiency of parameter estimation by estimating the translog cost function along with the cost-share equations as a system of equations.[8,9]

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[7] For example, consider a steel mill with a cost of production of $300/ShT and current visible cost of regulation of $10/ShT, or 3.33 percent of total cost of production. Suppose an increase in regulatory stringency causes an increase of $1 in the visible regulatory cost, to $11. If no hidden regulatory costs exist, then the total cost of production also increases by $1/ShT, to $301/ShT. The elasticity of total cost with respect to changes in regulatory restriction is 0.0333, calculated as percentage change in total cost/percentage change in visible cost of regulation [(1/300)/(1/10)]. This is the same as the current proportion of visible cost to the total cost of production. Instead, suppose there are hidden costs of regulation of $4/ShT. Then the total cost will increase to $305/ShT, yielding an elasticity of regulation of 0.1667; [(5/300)/(1/10) = 50/300 = 0.1667). Alternatively, $\partial \ln C/\partial \ln R = (\partial C/\partial R)(R/C)$. If $\partial C/\partial R = 1$, then $\partial \ln C/\partial \ln R = (R/C)$.

The translog cost function has the form:

$$
\begin{aligned}
C = \exp(&\beta_0 + \sum_i \beta_i \ln P_i + \beta_Y \ln Y + \beta_T T + \beta_R \ln R + \frac{1}{2} \sum_i \sum_j \gamma_{ij} \ln P_i \ln P_j \\
&+ \sum_i \gamma_{iY} \ln P_i \ln Y + \sum_i \gamma_{iT} \ln P_i\, T + \sum_i \gamma_{iR} \ln P_i \ln R + \frac{1}{2} \gamma_{YY} (\ln Y)^2 \\
&+ \gamma_{YT} \ln Y\, T + \gamma_{YR} \ln Y \ln R + \frac{1}{2} \gamma_{TT} T^2 + \gamma_{TR} T \ln R + \frac{1}{2} \gamma_{RR} (\ln R)^2)
\end{aligned} \tag{2}
$$

where i, j $\in$ (L, M, E, K).

We impose the following linear homogeneity constraints:

$$\beta_L + \beta_M + \beta_E + \beta_K = 1; \tag{3}$$

$$\sum\nolimits_i \gamma_{ij} = 0; \tag{4}$$

$$\sum\nolimits_j \gamma_{ij} = 0. \tag{5}$$

The restrictions of linear homogeneity in input prices assure that when prices of all the inputs increase by a fixed percent, holding all else constant, total cost also increases by the same percent.

We also impose the symmetry conditions:

$$\gamma_{ij} = \gamma_{ji}. \tag{6}$$

By Shephard's (1970) lemma, the cost-share (S_i) of input i equals the partial derivative $\partial \ln C / \partial \ln P_i$. Hence, we express the cost shares of labor (S_L), materials (S_M), energy (S_E), and capital (S_K) as:

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[8] Other major strengths of the translog function are that one can: (1) obtain and test simpler functions that exhibit constant returns to scale, input neutral technical change, and so forth, by simple parameter restrictions on the general form; and (2) directly calculate elasticities of substitution and conditional factor-demand functions from the estimated cost-function parameters. Some of the limitations of translog functions are: (1) translog parameter estimates are local Taylor series approximations and hence are most accurate around the expansion point; (2) the estimated cost functions are not guaranteed to satisfy conditions of concavity in input prices and positive cost shares required of proper cost functions and, hence, one must test the estimated cost functions for these regularity conditions; and (3) when production technology is very complex or when substitution is very easy or very difficult, inferences on the estimated elasticities are not robust. Refer to Guilkey et al. (1983), Byron and Bera (1983), Jorgenson and Wilcoxen (1990), and Berndt (1996) for further details and applications.

[9] Lanen and Larcker (1992) use the translog cost function to examine whether electric utilities' adoption of compensation contracts is related to the interaction between changes in the regulatory environment and the level of productive efficiency.

$$S_L = \beta_L + \sum_j \gamma_{Lj} \ln P_j + \gamma_{LY} \ln Y + \gamma_{LT} T + \gamma_{LR} \ln R; \qquad (7)$$

$$S_M = \beta_M + \sum_j \gamma_{Mj} \ln P_j + \gamma_{MY} \ln Y + \gamma_{MT} T + \gamma_{MR} \ln R; \qquad (8)$$

$$S_E = \beta_E + \sum_j \gamma_{Ej} \ln P_j + \gamma_{EY} \ln Y + \gamma_{ET} T + \gamma_{ER} \ln R; \qquad (9)$$

$$S_K = \beta_K + \sum_j \gamma_{Kj} \ln P_j + \gamma_{KY} \ln Y + \gamma_{KT} T + \gamma_{KR} \ln R. \qquad (10)$$

We obtain the marginal effect of regulation on cost by the partial derivative $\partial \ln C / \partial \ln R$, where:

$$\frac{\partial \ln C}{\partial \ln R} = \beta_R + \sum_i \gamma_{iR} \ln P_i + \gamma_{YR} \ln Y + \gamma_{TR} T + \gamma_{RR} \ln R. \qquad (11)$$

If the hypothesis that $\partial \ln C / \partial \ln R = 0$ cannot be rejected, then regulations have no effect on production costs. The parameter restrictions to test this hypothesis are:

$$\beta_R = \gamma_{LR} = \gamma_{MR} = \gamma_{ER} = \gamma_{KR} = \gamma_{YR} = \gamma_{TR} = \gamma_{RR} = 0. \qquad (12)$$

A positive value of $\partial \ln C / \partial \ln R$ indicates that regulation increases production cost, and conversely.

The values of the parameters γ_{LR}, γ_{MR}, γ_{ER}, and γ_{KR} reveal the effect of environmental regulations on various input cost shares. We partition the costs of regulation in various input cost categories using these coefficient estimates.

We estimate the cost function in equation (2) and the four factor-share equations (7) through (10) as a system of seemingly unrelated regression equations (SURE), by adding a stochastic disturbance term to each equation (Greene 1993, 526–531; Berndt 1996, 469–487). The error terms are correlated across equations because the cost shares must sum to 1. SURE estimation improves the efficiency of parameter estimates when cross-equation errors are correlated. To overcome singularity of the covariance matrix (because the cost shares sum to 1), we normalize the total cost and prices by the price of capital and delete the capital-share equation. We use maximum likelihood procedures to estimate the resulting system, and perform separate estimations for the integrated mills and mini-mill samples.

IV. DATA

Plant-level data on input prices, input quantities, output, and the regulatory expenditure are from the Census of Manufacturers, Annual Survey of Manufacturers, Manufacturing Energy Consumption Survey, and PACE surveys available at the Census Bureau.[10] We use data from 55 steel mills, covering the period 1979 to 1988.[11] We limit our sample to mills for which data on all variables are available. The final sample consists of 109 observations for 29 mini-mill plants (belonging to 27 mini-mill firms), and 94 observations for 26 integrated steel plants (belonging to 16 integrated steel firms), covering the years 1979, 1980,

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[10] These data are not publicly available and were collected while the first author was a Special Sworn Employee at the Center for Economic Studies, U.S. Census Bureau. Confidentiality agreements with the U.S. Census Bureau prohibit identifying individual firms.

[11] The Annual Survey of Manufacturers is a sample survey conducted every year, whereas the Manufacturing Energy Consumption Survey is a sample survey conducted once every three years. Hence, data are not available for all mills for all years. However, there was a special annual energy consumption survey during 1975–1981. Census of Manufacturers is conducted once every five years.

1981, 1985, and 1988. During the period of our study, a total of 89 mini-mill firms and 17 integrated-mill firms operated in the U.S. steel industry. Our coverage of mini-mills is less complete because Manufacturing Energy Consumption Survey and Annual Survey of Manufacturers databases cover only a random sample of mini-mills.

The following are descriptions of how we construct the variables used to estimate the cost function.

Price of Labor (P_L): The price of labor is the average cost per employee, including salaries, wages, and benefits. Data on the total number of employees and total labor costs are from the Annual Survey of Manufacturers and Census of Manufacturers databases.

Price of Materials (P_M): Steel firms use numerous types of direct materials to produce steel. Coal, coke, scrap, ingots, ores, and agglomerates (pellets and sinter) account for about 85 percent of total material costs. Annual data on total materials and parts expenditures are available in Annual Survey of Manufacturers. However, only Census of Manufacturers, conducted once every five years, collects data on quantities in addition to expenditures on individual materials. We derive a composite divisia index of material price for each individual plant using the data on the previously mentioned seven materials for the years 1977, 1982, and 1987.[12] A simple, linear interpolation of individual plant material price indices yielded the price indices for the intervening years. However, we use the actual total expenditures on materials and parts to calculate material cost shares in our estimation.

Price of Energy (P_E): The steel-making process consumes various types of energy, such as natural gas, electricity, distillate fuel oil, residual fuel oil, and liquid petroleum gas. Plant-level fuel consumption and expenditure data are from Manufacturing Energy Consumption Survey for 1985 and 1988, and special energy consumption surveys conducted by the Census Bureau prior to 1985. We calculate the prices of individual fuels in \$/million British thermal units of energy paid by each plant, and derive an aggregate divisia energy price index for individual mills using the fuel cost shares.

Price of Capital (P_K): We use the Hall and Jorgenson (1967) procedure to calculate the service price of capital. Hence:

$$P_{K(t)} = [q_{t-1}r_t + \delta q_t - (q_t - q_{t-1}) + q_tX_t]\,\frac{1 - u_tz_t - k_t}{1 - u_t} \tag{13}$$

where:

$P_{K(t)}$ = service price of capital,
q_t = price index of new capital equipment,
r_t = after-tax risk-adjusted rate of return on capital (opportunity cost),
δ = rate of economic depreciation,
X_t = effective property tax rate,

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[12] Divisia price index is the sum of prices of individual components weighted by their cost shares. For example, if a plant paid \$20/ShT for pellets and \$30/ShT of sinters, and if pellets accounted for 40 percent of material costs and sinters 60 percent, then the divisia price index is $[(20 \times 0.4) + (30 \times 0.6)] = \$26$/ShT. Divisia index is appropriate for input groups that are functionally separable (i.e., inputs within the subgroup are easily substitutable [Varian 1992, 150]).

u_t = effective corporate income tax rate,
z_t = present value of allowed depreciation tax deductions on a dollar's investment over the lifetime of an asset,
k_t = investment tax credit,
t = year.

This service price of capital compensates the owner of assets for the real opportunity cost of capital (r) and economic depreciation of the asset (δ), after adjusting for capital appreciation due to asset price changes ($q_t - q_{t-1}$,) and the tax effects. The capital stock price indices for the steel industry are from Gray (1987) and have been updated. We use the average after-tax yield to maturity of the bonds issued by the parent company as a plant's risk-adjusted opportunity cost of capital. Whenever bond data were not available for a particular firm, we use the average yield on Moody's "Baa" bonds for the integrated mills, and the yield on "A" bonds for the mini-mills. This reflects the relatively lower risk of mini-mills during this period. The economic depreciation rates are from Hulten and Wykoff (1981). The tax-rate information is from Jorgenson and Yun (1991) and Jorgenson and Landau (1993).

Capital Stock: We use the perpetual inventory method proposed by Christensen and Jorgenson (1969) to estimate the real capital stock.[13] Using data on capital additions and retirements from the Annual Survey of Manufacturers database, we constructed a real capital-stock series for the period 1972 to 1989.

Output (Y): Steel mills produce a wide variety of products. In the Annual Survey of Manufacturers, steel mills report 95 separate product classes. However, nine product classes account for about 95 percent of the total value of shipments.[14] We weight the quantities (in short tons) of products by the average relative sales price of the product and then sum to construct a single composite output quantity index. For example, if the average price of hot-rolled steel sheet is $300/ShT and the average price of cold-rolled steel sheet is $330 /ShT, then one ShT of cold-rolled steel is considered equivalent to 1.1 ShT of hot-rolled steel in our output measure.[15] Average prices for each product class are from the annual Current Industrial Reports. Relative prices are with respect to the price of hot-rolled sheets and strip.

Time (T): Time T is a trend variable that allows for technological progress over the years. The value of T for year 1983 is set at 0, so T equals −4 in 1979, and 5 in 1988.

Regulation (R): Ideally, we would measure regulatory stringency based on specific constraints on the production process, such as the emission limit on a particular pollutant.

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[13] Real capital stock in period t = Real capital stock at beginning of period (t − 1) + Real capital stock added in period (t − 1) − Real economic depreciation for period (t − 1). We start the capital-stock series in 1972, using the book value of assets in 1972 to minimize the errors in real capital-stock estimates due to differences in economic and accounting depreciation rates.

[14] These products are hot-rolled sheet and strip (40 percent of total value), hot-rolled bars (23 percent), cold-rolled sheet and strip (15 percent), ingots and other semi-finished products (8 percent), pipes and tubes (4 percent), cold-finished bars (2 percent), rails and heavy structurals (2 percent), and steel wire (1 percent).

[15] Such a composite index is appropriate when the relative prices of the components are fixed (Varian 1992, 148) and higher prices arise mainly due to increased processing costs. In steel mills, processes until molten steel making are common to all steel products, and individual product prices reflect higher processing (generally rolling and coating) costs from that stage. The ratio of prices of various types of steel output relative to hot-rolled sheet are fairly constant for the period 1972–1989, with standard deviations of less than 5 percent.

However, steel mills must comply with a large number of process-specific technology standards and emission limits, and the timetables for meeting different standards on process units vary. For example, the national emissions standards for hazardous air pollutants specify separate emission limits for six emission points on a coke oven. Firms can choose from among four compliance tracks, each of which provides interim emission limits and the dates by which the firms must meet them (USITC 1994). Furthermore, many steel plants had in the past negotiated individual "stretch-out" compliance timetables with the EPA and State agencies based on their financial situations, investment needs, and union pressures (Landy et al. 1990). Because it is very difficult to operationalize regulatory stringency in terms of specific constraints on the production process, we use annual pollution-abatement operating expenditures (including the depreciation on the pollution-abatement capital) as a comprehensive measure of regulatory intensity. Environmental expenditures provide a reasonable proxy for regulatory pressure by aggregating realized effects of emission standards, legal and political battles, technical negotiations, enforcement effort, and innovation. Using environmental operating expenditures as the measure of regulatory intensity also allows a straightforward interpretation of the estimated elasticity of total costs with respect to regulation.

Data on plant-level annual operating expenditures on pollution abatement are from the PACE surveys. We normalize the total expenditures by the plant output index to control for plant size.

Total Cost (C): The dependent variable, total cost, is the sum of total expenditures on labor, total materials cost, total expenditures on fuels and electricity, and capital cost measured as the product of real capital stock and the service price of capital described by equation (13).

V. RESULTS

Results from the Cost-Function Estimation

Parameter estimates for the translog cost functions for the integrated mills and the mini-mills appear in Tables 2 and 3, respectively.[16] Overall, the regressions are highly significant. The Tables report estimates of all the coefficients in the system of equations. The individual coefficients, which estimate the first-order and second-order slopes of the cost function in the input-price, output, time, and regulation dimensions, have limited direct interpretation value. We focus on the coefficients related to the effects of regulation on cost since our primary interest is in estimating the hidden costs of regulation. (The other coefficients are useful for calculating substitution elasticities among various inputs, conditional input factor-demand equations, scale effects, and the productivity growth rate.)

The elasticity of total cost with respect to regulation, evaluated as the means of the variables using equation (11), appears in Table 4 (Row 3). The elasticity estimates are positive, indicating that regulation is associated with higher total costs. The likelihood ratio test rejects the null hypothesis that there are no effects of environmental regulation on costs—i.e., that $\partial \ln C/\partial \ln R = 0$ for both the integrated mills ($\chi^2 = 43.44$, $p < 0.01$) and the mini-mills ($\chi^2 = 72.69$, $p < 0.01$). The estimated elasticities are 0.3079 for integrated

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[16] Because we are estimating a system of equations and imposing cross-equation parameter restrictions, the degrees of freedom available are: $(mt - k)$ where m = number of equations, t = number of observations, and k = number of parameters to be estimated. Hence, the degrees of freedom are 348 for the integrated-mills sector, and 408 for the mini-mill sector. Because we dropped the capital-share equation, we calculate the eight capital-related parameters listed in Tables 2 and 3 from other parameter estimates using the constraints in equations (3), (4), and (5).

TABLE 2
Estimated Hidden Costs for Integrated Mills

Model
Cost Function:

$$C = exp(\beta_0 + \sum_i \beta_i \, ln \, P_i + \beta_Y \, ln \, Y + \beta_T T + \beta_R \, ln \, R + \frac{1}{2} \sum_i \sum_j \gamma_{ij} \, ln \, P_i \, ln \, P_j + \sum_i \gamma_{iY} \, ln \, P_i \, ln \, Y$$

$$+ \sum_i \gamma_{iT} \, ln \, P_i \, T + \sum_i \gamma_{iR} \, ln \, P_i \, ln \, R + \frac{1}{2} \gamma_{YY} (ln \, Y)^2$$

$$+ \gamma_{YT} \, ln \, Y \, T + \gamma_{YR} \, ln \, Y \, ln \, R + \frac{1}{2} \gamma_{TT} T^2 + \gamma_{TR} T \, ln \, R + \frac{1}{2} \gamma_{RR} (ln \, R)^2$$

Cost Share Equations:

$$S_L = \beta_L + \sum_j \gamma_{Lj} \, ln \, P_j + \gamma_{LY} \, ln \, Y + \gamma_{LT} T + \gamma_{LR} \, ln \, R$$

$$S_M = \beta_M + \sum_j \gamma_{Mj} \, ln \, P_j + \gamma_{MY} \, ln \, Y + \gamma_{MT} T + \gamma_{MR} \, ln \, R$$

$$S_E = \beta_E + \sum_j \gamma_{Ej} \, ln \, P_j + \gamma_{EY} \, ln \, Y + \gamma_{ET} T + \gamma_{ER} \, ln \, R$$

$$S_K = \beta_K + \sum_j \gamma_{Kj} \, ln \, P_j + \gamma_{KY} \, ln \, Y + \gamma_{KT} T + \gamma_{KR} \, ln \, R$$

Cost Function Parameter Estimates for Integrated Mills (n = 94)

Parameter	*Estimated Value*	*Standard Error*	*Parameter*	*Estimated Value*	*Standard Error*
Intercept (β_O)	13.5000**	0.0607	Labor × Output (γ_{LY})	−0.0009	0.0090
Labor (β_L)	0.2979**	0.0109	Material × Output (γ_{MY})	−0.0082	0.0127
Materials (β_M)	0.5097	0.0153	Energy × Output (γ_{EY})	0.0111**	0.0038
Energy (β_E)	0.0928**	0.0045	Capital × Output (γ_{KY})	−0.0020	0.0043

(*Continued on next page*)

TABLE 2 (Continued)

Cost Function Parameter Estimates for Integrated Mills ($n = 94$)

Parameter	*Estimated Value*	*Standard Error*	*Parameter*	*Estimated Value*	*Standard Error*
Capital (β_K)	0.0994**	0.0052	Labor × Time (γ_{LT})	−0.0013	0.0034
Output (β_Y)	1.0480**	0.0492	Material × Time (γ_{MT})	−0.0074	0.0045
Time (β_T)	0.0033	0.0121	Energy × Time (γ_{ET})	0.0020	0.0014
Regulation (β_R)	**0.3853****	**0.0564**	Capital × Time (γ_{KT})	0.0067**	0.0021
Labor × Labor (γ_{LL})	0.0844**	0.0222	**Labor × Regulation (γ_{LR})**	**0.0316****	**0.0094**
Labor × Material(γ_{LM})	0.0074	0.0157	**Material × Regulation (γ_{MR})**	**−0.0513****	**0.0133**
Labor × Energy (γ_{LE})	−0.0266**	0.0090	**Energy × Regulation (γ_{ER})**	**0.0101***	**0.0040**
Labor × Capital (γ_{LK})	−0.0065	0.0149	**Capital × Regulation (γ_{KR})**	**0.0096****	**0.0045**
Material × Material (γ_{MM})	−0.0020	0.0220	Output × Output (γ_{YY})	0.1524*	0.0647
Material × Energy (γ_{ME})	0.0237**	0.0063	Output × Time (γ_{YT})	−0.0053	0.0106
Material × Capital (γ_{MK})	−0.0109	0.0075	**Output × Regulation (γ_{YR})**	**0.1555****	**0.0423**
Energy × Energy (γ_{EE})	−0.0089	0.0067	Time × Time (γ_{TT})	0.0164	0.0086
Energy × Capital (γ_{EK})	0.0119	0.0075	**Time × Regulation (γ_{TR})**	**0.0091**	**0.0113**
Capital × Capital (γ_{KK})	0.0643**	0.0173	**Regulation × Regulation (γ_{RR})**	**0.0577**	**0.0471**

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*, ** Significant at $\alpha = 0.05$, $\alpha = 0.01$, respectively.

Parameter estimates related to regulation are indicated in **bold**.

Total degrees of freedom = (mt − k) where m = number of equations, t = number of observations, and k = number of parameters to be estimated = (4 × 94 − 28) = 348. (See footnote 16 for details.)

Years covered by the data = 1979, 1980, 1981, 1985, 1988.

Log-likelihood = 490.92; Log-likelihood = 36.21 (when $\beta = 0$).

R^2 (Total Cost Function) = 0.89; R^2 (Labor Cost Function) = 0.20; R^2 (Material Cost Function) = 0.08; R^2 (Energy Cost Function) = 0.11.

TABLE 3
Estimated Hidden Costs for Mini-Mills

Model
Cost Function:

$$C = exp(\beta_0 + \sum_i \beta_i\, ln\, P_i + \beta_Y\, ln\, Y + \beta_T T + \beta_R\, ln\, R + \frac{1}{2}\sum_i \sum_j \gamma_{ij}\, ln\, P_i\, ln\, P_j + \sum_i \gamma_{iY}\, ln\, P_i\, ln\, Y$$

$$+ \sum_i \gamma_{iT}\, ln\, P_i\, T + \sum_i \gamma_{iR}\, ln\, P_i\, ln\, R + \frac{1}{2}\gamma_{YY}\, (ln\, Y)^2$$

$$+ \gamma_{YT}\, ln\, Y\, T + \gamma_{YR}\, ln\, Y\, ln\, R + \frac{1}{2}\gamma_{TT}T^2 + \gamma_{TR}T\, ln\, R + \frac{1}{2}\gamma_{RR}(ln\, R)^2$$

Cost Share Equations:

$$S_L = \beta_L + \sum_j \gamma_{Lj}\, ln\, P_j + \gamma_{LY}\, ln\, Y + \gamma_{LT}T + \gamma_{LR}\, ln\, R$$

$$S_M = \beta_M + \sum_j \gamma_{Mj}\, ln\, P_j + \gamma_{MY}\, ln\, Y + \gamma_{MT}T + \gamma_{MR}\, ln\, R$$

$$S_E = \beta_E + \sum_j \gamma_{Ej}\, ln\, P_j + \gamma_{EY}\, ln\, Y + \gamma_{ET}T + \gamma_{ER}\, ln\, R$$

$$S_K = \beta_K + \sum_j \gamma_{Kj}\, ln\, P_j + \gamma_{KY}\, ln\, Y + \gamma_{KT}T + \gamma_{KR}\, ln\, R$$

Cost Function Parameter Estimates for Mini-Mills (n = 109)

Parameter	*Estimated Value*	*Standard Error*	*Parameter*	*Estimated Value*	*Standard Error*
Intercept (β_O)	12.4020**	0.0479	Labor × Output (γ_{LY})	0.0209*	0.0083
Labor (β_L)	0.3225**	0.0095	Material × Output (γ_{MY})	−0.0290**	0.0102
Materials (β_M)	0.4936**	0.0119	Energy × Output (γ_{EY})	0.0122**	0.0036
Energy (β_E)	0.1116**	0.0035	Capital × Output (γ_{KY})	0.0203**	0.0034

(Continued on next page)

TABLE 3 (Continued)

Cost Function Parameter Estimates for Mini-Mills (n = 109)

Parameter	*Estimated Value*	*Standard Error*	*Parameter*	*Estimated Value*	*Standard Error*
Capital (β_K)	0.0722**	0.0034	Labor × Time (γ_{LT})	−0.0016	0.0028
Output (β_Y)	0.8275**	0.0321	Material × Time (γ_{MT})	0.0009	0.0034
Time (β_T)	−0.0159	0.0085	Energy × Time (γ_{ET})	−0.0026*	0.0012
Regulation (β_R)	**0.3789****	**0.0468**	Capital × Time (γ_{KT})	0.0034**	0.0014
Labor × Labor (γ_{LL})	0.0621**	0.0193	**Labor × Regulation (γ_{LR})**	**0.0057**	**0.0111**
Labor × Material(γ_{LM})	0.0118	0.0178	**Material × Regulation (γ_{MR})**	**0.0018**	**0.0140**
Labor × Energy (γ_{LE})	−0.0425**	0.0095	**Energy × Regulation (γ_{ER})**	**−0.0033**	**0.0039**
Labor × Capital (γ_{LK})	−0.0314**	0.0106	**Capital × Regulation (γ_{KR})**	**−0.0042**	**0.0040**
Material × Material (γ_{MM})	0.0491*	0.0222	Output × Output (γ_{YY})	−0.2020**	0.0479
Material × Energy (γ_{ME})	−0.0333**	0.0063	Output × Time (γ_{YT})	0.0052	0.0072
Material × Capital (γ_{MK})	−0.0277**	0.0065	**Output × Regulation (γ_{YR})**	**0.1622****	**0.0344**
Energy × Energy (γ_{EE})	0.0541**	0.0109	Time × Time (γ_{TT})	−0.0011	0.0057
Energy × Capital (γ_{EK})	0.0216*	0.0092	**Time × Regulation (γ_{TR})**	**−0.0111**	**0.0120**
Capital × Capital (γ_{KK})	0.0375**	0.0136	**Regulation × Regulation (γ_{RR})**	**0.1614****	**0.0329**

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*, ** Significant at $\alpha = 0.05$, $\alpha = 0.01$, respectively.

Parameter estimates related to regulation are indicated in **bold**.

Total degrees of freedom = (mt − k) where m = number of equations, t = number of observations, and k = number of parameters to be estimated = (4 × 109 − 28) = 408. (See footnote 16 for details.)

Years covered by the data = 1979, 1980, 1981, 1985, 1988.

Log-likelihood = 614.54; Log-likelihood = 10.41 (when $\beta = 0$).

R^2 (Total Cost Function) = 0.95; R^2 (Labor Cost Function) = 0.23; R^2 (Material Cost Function) = 0.04; R^2 (Energy Cost Function) = 0.49.

TABLE 4
Estimated Effect of Regulation on Total Cost and Hidden Costs

	Integrated Mills	*Mini-Mills*
Mean cost of production (\$/ShT)	360	340
Visible cost of environmental regulation (\$/ShT)	12	9
Elasticity of total cost with respect to regulation, $\partial \ln C/\partial \ln R$ (standard errors in parentheses)[a]	0.3079 (0.0416)	0.2827 (0.0376)
Increase in total cost/ShT for \$1/ShT increase in visible cost of environmental regulation[b]	9.23	10.68
Hidden regulatory cost at the margin per ShT for \$1/ShT increase in visible cost	8.23	9.68

[a] We calculate the regulatory elasticity using the coefficient estimates reported in Tables 2 and 3 and equation (11) as follows:

Integrated Mills: $$\partial \ln C/\partial \ln R = 0.3853 + (0.0316 \times \ln P_L) - (0.0513 \times \ln P_M) + (0.0101 \times \ln P_E) + (0.0096 \times \ln P_K) + (0.1555 \times \ln Y) + (0.0091 \times T) + (0.0577 \times \ln R).$$

Mini-Mills: $$\partial \ln C/\partial \ln R = 0.3789 + (0.0057 \times \ln P_L) + (0.0018 \times \ln P_M) - (0.0033 \times \ln P_E) - (0.0042 \times \ln P_K) + (0.1622 \times \ln Y) - (0.0111 \times T) + (0.1614 \times \ln R).$$

We use the mean values of $\ln P_L$, $\ln P_M$, $\ln P_E$, $\ln P_K$, $\ln Y$, and $\ln R$ in the calculations.

[b] A \$1 per ShT increase in regulatory cost amounts to an increase of 8.33 percent of the visible regulatory costs for integrated mills ($1/12 = 0.0833$) and 11.11 percent of the visible regulatory costs for mini-mills ($1/9 = 0.1111$). Increase in total cost is calculated as (mean cost of production per ShT) × ($\partial \ln C/\partial \ln R$) × (Proportion of increase in visible cost of regulation); that is, $360 \times 0.3079 \times 0.0833$ (for integrated mills) and $340 \times 0.2827 \times 0.1111$ (for mini-mills).

mills and 0.2827 for mini-mills.[17] A 1 percent increase in regulatory stringency from its average value (as measured by the reported environmental operating expenditure/ShT) is associated with a 0.3079 percent increase in total costs at the margin for integrated mills, and 0.2879 percent increase in costs for mini-mills.

These regulatory elasticity estimates indicate that hidden costs are substantial. Consider an integrated mill with an average production cost of \$360/ShT and reported environmental operating costs of \$12/ShT (Table 4).[18] Any increase in regulatory stringency causing a \$1 increase in reported or "visible" environmental operating expenditures is associated with an increase in firms' total cost by \$9.23 at the margin. However, \$8.23 of the incremental cost of regulatory compliance is hidden under other (nonregulatory) accounts. Similarly, for a mini-mill with an average production cost of \$340/ShT and reported environmental operating expenditures of \$9/ShT, a \$1 increase in the visible portion of environmental regulation cost is associated with an increase in total cost by \$10.68 at the margin, of which \$9.68 is in the form of hidden costs accumulated under other accounts. Thus, hidden costs associated with environmental regulation far exceed the visible costs of pollution abatement. Tables 2 and 3 also show that γ_{YR} has a significant positive coefficient for both the sectors. This suggests that increased regulatory stringency is associated with reduced levels of scale economies.

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[17] We calculate the standard error of the regulatory elasticity reported in Table 4 using the variance-covariance matrix of the estimated coefficients, because $\partial \ln C/\partial \ln R$ is a linear function of estimated coefficients.

[18] The sample average environmental expenditure was \$12.06/ShT output index. The environmental expenditures reported in Table 1 are per ton of steel-mill products produced by the total steel industry, and hence not directly comparable.

These hidden costs are estimates at the margin. The current model does not estimate the average level of hidden costs. If the current average visible cost of environmental regulation in the steel industry is approximately \$10/ShT, then the elasticity estimates do not mean that the average total environmental cost is \$92 to \$117/ShT. The average cost is likely to be less than the estimated marginal cost of regulation because it is, initially, relatively inexpensive to reduce emissions, and the marginal costs of emission abatement increase as stringency increases (i.e., the marginal cost curve is nonlinear and rising). However, the estimates indicate that increases in regulatory stringency from the current levels are likely to trigger large hidden costs.

Other Estimation Issues

The estimated cost functions are not guaranteed to satisfy properties of positive fitted-cost shares and concavity in input prices required for proper cost functions. Concavity in input prices ensures that, when the price of one input increases, holding everything else constant, the total cost does not decrease and costs increase at a decreasing rate as firms shift away from the relatively more expensive input. In our estimated cost functions, all the fitted-cost shares were positive, and concavity conditions were satisfied at about 90 percent of the data points.[19] Hence, we assume that the estimated cost function satisfies the desired theoretical properties.

Output quantity can be endogenous to the model. We test for endogeneity of output in the cost function using the omitted variable version of the Hausman Test[20] and reject the hypothesis that endogeneity bias exists, for both the mini-mill and the integrated-mill samples.

Inefficiency in estimation due to serial correlation is not likely to be a problem, because we have a relatively large number of plants and only a few time periods, and because gaps between the reporting years allow any serial correlation effects to fade. In addition, because our estimation does not include lagged dependent variables, coefficient estimates are unbiased.[21]

The 55 plants in our sample represent 43 firms with no one firm contributing more than three sites. During our interviews, the managers of steel firms with multiple plants indicated that reporting for the PACE survey was decentralized at the plant level. Similarly, most of these steel firms' managerial accounting systems are decentralized. Hence, common practices at the firm level do not significantly affect our estimates.

The estimated regulatory elasticity measures the variation in total costs associated with variations in the reported visible environmental costs. This does not establish causality. Firms may incur expenses that improve quality and worker safety, as well as environmental performance. To the extent this bundling occurs, increases in total cost associated with an increase in the reported visible environmental cost may not be entirely attributable to regulation, thereby overstating hidden costs. Conversely, to the extent that steel firms bundled environmental expenditures with productivity-improvement projects, the associated increase in total cost may underestimate regulatory effects. Our model estimates the net effect of any such bundled expenditures. However, statistical analysis using data from a large number of plants over many years is likely to distinguish between costs that vary systematically with visible environmental expenditures and costs that were associated temporarily. Finally, the steel firm managers we interviewed indicated that they generally did not systematically bundle other expenditures with environmental expenditures.

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[19] Even where there were violations of the concavity conditions, the eigenvalues of the Hessian matrix were very close to 0 (< 0.01). Given the computational complexity, we assume that these equal 0 and hence satisfy concavity conditions.

[20] We use the gross state product and its growth rate in the state where the plant is located to create an instrumental variable for output.

[21] The standard Durbin-Watson test for serial correlation is not applicable because we estimate a system of equations with cross-equation parameter restrictions, using panel data with some time gaps.

The model is based on contemporaneous variations in total and regulatory costs, and does not incorporate learning effects that may reduce hidden costs in subsequent periods.

Extent of Hidden Costs in Major Cost Pools

In this section, we estimate the extent of hidden costs in different types of cost pools. The mean cost shares of the four major input cost pools (i.e., labor, materials, energy, and capital) appear in Table 5. For example, the mean share of labor in the total cost of production is 28.8 percent for the integrated-mills sector, and mean cost shares for materials, energy, and capital are 55.67 percent, 7.77 percent, and 7.76 percent, respectively.

A 1 percent increase in environmental operating costs has two effects. First, it is associated with an increase of 0.3079 percent in total costs for integrated mills and 0.2827 percent for mini-mills (Table 4). Second, for the integrated-mills sector, it is also associated with a shift in the cost shares of each of the four inputs (labor, materials, energy, and capital) as indicated by the statistically significant parameter estimates for γ_{LR}, γ_{MR}, γ_{ER}, and γ_{KR} in Table 2. Results suggest that for the integrated-mills sector, a change in regulatory stringency that increases visible environmental operating costs by \$1/ShT increases total costs by \$9.23/ShT (per Tables 4 and 5), and changes the share of labor cost from 28.80 percent to 29.05 percent,[22] materials cost share from 55.67 percent to 55.26 percent, energy cost share from 7.77 percent to 7.85 percent, and capital cost share from 7.76 percent to 7.84 percent. The negative parameter estimate for γ_{MR} implies that the share of materials cost in the total cost declines after the increase in regulatory stringency, consistent with steel mills' responding to more stringent regulations by using materials more efficiently and cutting waste.[23]

For the mini-mill sector, the parameter estimates of γ_{LR}, γ_{MR}, γ_{ER}, and γ_{KR} are not statistically different from 0. This indicates that the cost shares of various inputs do not change significantly in response to an increase in regulatory stringency. Thus, the cost shares of labor, materials, energy, and capital remain at 30.55 percent, 51.75 percent, 11.96 percent, and 5.74 percent, respectively, before and after an increase in regulatory stringency. Total cost however, increases from \$340/ShT to \$350.68/ShT in response to a \$1/ShT increase in the reported (visible) cost of environmental regulation.

Table 5 also reports the mean costs in various input cost pools before and after a \$1/ShT increase in the reported (visible) cost of environmental regulations. The change in

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[22] From equation (7), the change in labor cost shares is $\Delta S_L = \gamma_{LR} \times \Delta(\ln R)$. Therefore, a \$1 increase in regulatory cost from \$12 to \$13 changes the labor cost share by $\gamma_{LR} \times (\ln 13 - \ln 12) = 0.0316 \times 0.08 = 0.0025$. The new cost share of labor after the increase in regulatory stringency will be $0.288 + 0.0025 = 0.2905$ (i.e., 29.05 percent). Similar calculations yielded estimates of changes in other input cost shares.

[23] For example, more stringent coke-oven regulations led to reduction in coke use from 0.65 ton per ton of raw steel produced in 1973 to 0.45 tons/ton in 1994. Similarly, the yield of finished steel products/ton of raw steel produced increased from 70 percent in 1973 to about 90 percent in 1994.

TABLE 5
Estimated Hidden Costs in Major Cost Categories

	Integrated Mills	Mini-Mills
Parameter Estimates[a]		
Labor × Regulation (γ_{LR})	0.0316	ns[b]
Material × Regulation (γ_{MR})	−0.0513	ns
Energy × Regulation (γ_{ER})	0.0101	ns
Capital × Regulation (γ_{KR})	0.0096	ns
Average Unit Cost in Dollars (Cost Shares in parentheses)		
Labor	103.68 (28.80%)	103.87 (30.55%)
Material	200.41 (55.67%)	175.95 (51.75%)
Energy	27.97 (7.77%)	40.66 (11.96%)
Capital	27.94 (7.76%)	19.52 (5.74%)
Total Unit Cost	360.00	340.00
Average Unit Cost in Dollars, after a $1/ShT Increase in Regulatory Stringency[c] **(Cost Shares in parentheses)**		
Labor	107.26 (29.05%)	107.13 (30.55%)
Material	204.04 (55.26%)	181.48 (51.75%)
Energy	28.98 (7.85%)	41.94 (11.96%)
Capital	28.95 (7.84%)	20.13 (5.74%)
Total Unit Cost	369.23	350.68
Increase in Visible Regulatory Cost ($/ShT)[d]		
Labor	0.29	0.30
Material	0.55	0.52
Energy	0.08	0.12
Capital	0.08	0.06
Hidden Costs ($/ShT)[e]		
Labor	3.29	2.96
Material	3.08	5.01
Energy	0.93	1.16
Capital	0.93	0.55

[a] From Table 2 for integrated mills and Table 3 for mini-mills.

[b] Not Significant (ns).

[c] Average cost shares after a $1/ShT increase in regulation (see footnote 22 for example calculation).

[d] We assume that the visible increase in each cost category is proportional to the original cost share.

[e] Input cost after the $1/ShT increase in visible regulatory costs − Input cost before the $1/ShT increase in visible regulatory costs − Increase in visible regulatory input costs. For example, hidden labor cost for the integrated mills sector = 107.26 − 103.68 − 0.29 = 3.29.

total cost less the visible portion of regulatory expenses indicates the costs associated with environmental regulation that are hidden in other cost pools. In estimating these hidden and visible costs, we assume that the visible cost shares of labor, material, energy, and capital are the same as their respective shares of the total cost. For example, since labor costs are 29 percent of the total cost, we assume the labor cost share of the $1 increase in visible regulatory cost is $0.29. For the integrated-mill sector, the increase in regulatory stringency is associated with a $3.58/ShT increase in labor cost, from $103.68/ShT to $107.26/ShT. Of this $3.58 increase, only $0.29 is visible as an increase in regulatory labor costs. The remaining $3.29/ShT remains hidden in other labor cost pools. Total materials cost increases by $3.63/ShT (from $200.41/ShT to $204.04/ShT) of which $0.55 is in the form of visible environmental material costs and the remaining $3.08/ShT is hidden in other materials accounts. Similarly, hidden costs for energy and capital are $0.93/ShT each.

For the mini-mill sector, the labor cost increases from $103.87/ShT to $107.13/ShT. Of this $3.26/ShT increase, only $0.30 is in the form of visible environment-related labor expenses. Environmental expenses hidden in other direct and indirect labor accounts amount to $2.96/ShT. Similarly, $5.01/ShT is hidden in materials cost accounts, $1.16/ShT is hidden in energy costs and $0.55/ShT is hidden in various capital cost pools.

Results from Telephone Interviews

Our hidden-cost estimates are high. Hence, we conducted in-depth telephone interviews with steel firm managers to explore the validity of the econometric estimations and to gain insight into the following questions. First, do the PACE survey data reasonably represent the data from steel firms' internal management accounting systems? Second, are managers aware of the large hidden costs associated with environmental regulation? Third, what are the reasons for the large hidden costs? Do plant managers exercise discretion over reporting in the PACE surveys? Does the failure to include all costs associated with environmental regulations reflect managerial choices, ignorance, or a belief that a cost does not represent a regulatory cost even if it is associated with environmental regulation? Finally, what types of decisions are large hidden costs likely to affect?

We contacted senior-level managers of several integrated mills and mini-mills. We interviewed executives from a total of seven firms, which together account for about 40 percent of the total domestic U.S. steel production.[24] In some firms, we were able to interview plant-level accountants in addition to corporate-level managers. The individual interviews lasted up to two hours.

All the managers agreed that the PACE survey data were a good representation of the internal accounting systems' environmental cost data. One manager stated that "the PACE reports are our best available numbers. A lot of care is taken in obtaining these numbers. We still use the PACE survey format to keep track of environmental costs, although they are no longer required by the Census Bureau."

All managers were aware that the visible costs reported in PACE surveys and internal accounting systems fell short of the total cost of environmental regulation. One manager estimated that the total cost per ton of environmental regulations, including the hidden costs, could be as high as $40 per ton. This is approximately four times the average reported environmental costs for the year 1998 for our sample firms that reported environmental costs in their 10-K statements. Another manager said he would not be surprised if the hidden costs were very large. Other managers' initial estimates of total costs were lower at

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[24] These included one retired chief executive officer, one controller, one controller and vice president, one retired vice president, two managers of financial reporting, and one manager of environmental issues. We also talked to two plant-level accountants. Many of the executives we interviewed, including the CEO, had worked in other steel firms. Their judgment was that other steel firms' environmental accounting systems were similar. Hence, our observations are more generally applicable.

130 percent to 200 percent of reported costs. However, when we asked if they had considered costs of input substitutions, process changes, and other specific examples of hidden costs of regulation, most had not, and as result became less certain of their initial estimates.

The managers discussed several reasons for not reporting the hidden costs. It is often difficult to isolate the extent to which costs (such as process changes) are attributable to environmental regulation rather than other productivity-improvement initiatives. One manager mentioned continuous casting, which has quality and productivity benefits in addition to environmental benefits. It would be difficult to isolate the environmental portion of the total cost of converting to continuous casting. Similarly, overhead costs (such as utility costs) may have several drivers. One firm reported difficulty separating the electricity costs of different environmental processes and equipment because the firm used one common electricity meter. Further, environmental control components are an integral part of most modern process equipment, making the separation of environmental costs difficult. We also asked whether the firm's accounting system reported incremental costs of switching from sinters to pellets and other such input substitutions as environmental costs. All the managers agreed that their systems would not report these as environmental costs, but would instead include them in general material costs. Similarly, these firms did not separately track incremental costs of environmental training, reporting, permitting, and legal expenses. Managers also referred to difficulty aggregating across plants and functional areas. Most of the multiplant firms' costing systems are decentralized to the plant level. The operations/production department maintains some cost records, while the purchasing department maintains others. Detailed analysis, decomposition, and allocation of environmental costs require both technical and accounting expertise. Departments often failed to communicate while preparing these reports.

Technical staff at the plant level made input substitutions and changes in process parameters to meet emission limits, based on *ad hoc* cost analysis. However, the formal cost accounting system did not often change to report the incremental costs of these technical changes as environmental costs. For example, before choosing between sinters and pellets, engineers considered the trade-off between increased material costs and reduced environmental costs. Their accounting systems however, did not track the environmental component of incremental costs after switching to pellets.

When asked about the types of decisions likely to be compromised by hidden costs, most managers initially replied that it was not a major problem because these costs are eventually captured in the total cost of production. However, further discussions revealed that hidden costs can adversely affect responsibility accounting for cost variances, pricing contracts, product profitability analyses, and plant-closure and investment decisions.

Determining Responsibility for Cost Variances

Many steel plants use a standard costing system that compares actual performance to standard or budgeted performance. Plant managers are typically held responsible for material, labor, and overhead variances, but not for environmental costs. Hidden environmental costs distort the standard costing system. Consider an integrated steel mill with a production of 20,000 ShT per week and visible costs of environmental regulation of $12.50 per ShT—i.e., a total visible environmental cost of $250,000/week. Suppose environmental regulatory stringency as measured by the visible costs of regulation increases by $1 per ShT. The total increase in cost after considering hidden costs will be $9.23 per ShT, or $184,600/week. However, only $1 per ShT, or $20,000, will be visible as environmental cost, the remaining $164,600 will appear as unfavorable materials, labor, and overhead variances. The plant manager will be held responsible for these variances. If the increase in regulatory stringency falls outside the plant manager's control, then this distorts the responsibility accounting systems.

Pricing Contracts

Long-term supply contracts often include adjustment clauses for unforeseen cost increases arising from regulatory changes. If the internal costing systems report only the directly traceable visible costs, then hidden costs arising from changes in regulations will be attributed to other causes, including operating inefficiency. As a result, the firm may be disadvantaged in price negotiations. In our interviews, the vice president and controller of a large integrated steel firm mentioned that even though costs were increasing rapidly during the 1980s, the firm was unable to negotiate price increases with customers, because customers attributed these cost increases mainly to inefficient operations.

Product Profitability Analysis

The managers agreed that the stringency of environmental regulations and associated costs vary across products. Thus, hidden costs also differ across products; consequently, products with smaller hidden costs subsidize products with greater hidden costs.

Plant Closure Decisions

Managers indicated that a major trade-off in determining whether to shut down an older steel mill is the cost of bringing the plant into environmental compliance so that it can continue to operate and generate cash flow vs. the cost of pensions if the plant were shut down. If large hidden costs are associated with environmental compliance, and yet managers make these decisions based on only the visible costs of compliance, then some mills that should have closed would continue to operate. Managers recalled several steel mills that spent large amounts to come into compliance, only to discover that they could not break-even and, hence, subsequently closed. Hidden costs of regulations may have played a role in these apparently dysfunctional decisions.

Investment Decisions

Current costing systems are likely to underestimate cost savings from pollution-prevention projects. Managers who overlook savings in hidden costs from these investments are likely to underinvest in such projects.

Managers also need data on full costs of regulation to negotiate with regulators. Without accurate internal data on the total cost of regulations, firms may accept regulatory agencies' cost estimates, which may understate costs and result in excessively stringent regulations.

VI. DISCUSSION AND CONCLUSIONS

This paper examines empirically the extent to which accounting systems reveal the cost of complying with environmental regulation. We draw on production theory and flexible functional-form cost estimation to gain insight into the total cost of environmental regulations. Analysis of the U.S. steel industry indicates that accounting systems identify separately only a small portion of the costs of regulatory compliance. A $1 increase in the visible costs of regulation is associated with a $9.23 increase in total cost (at the margin) for the integrated-mill sector and $10.68 for the mini-mill sector. These results suggest that an increase in regulatory stringency would significantly increase product costs. The associated hidden costs of regulation are eight to ten times the visible costs at the margin.

Why have steel firm managers not attempted to estimate and include all the environmental costs in the reported costs, when firms have strong incentives to classify costs of regulation to support claims that they are overregulated? Our interviews reveal that managers are aware of these hidden costs. However, they often find it difficult to isolate and measure these hidden environmental cost components. Most steel firms still use traditional cost-accounting systems with only a few cost pools; obtaining more detailed estimates of environmental costs would require a major change in the cost-accounting systems. Many managers believe that collecting such detailed data on all regulatory costs does not pass a subjective cost-benefit test because these costs are captured under other cost categories, so the total cost of production is not misstated. However, with marginal hidden costs eight to nine times the magnitude of visible costs, a more detailed environmental accounting system may generate materially different accounting numbers that affect decisions. However, managers did not appear to have conducted quantitative cost-benefit tests, consistent with Foster and Young's (1997) conclusion that few firms attempt to quantify the expected benefits of updating their management accounting systems. Our results suggest that investing in more detailed environmental costing systems may be justified, at least in the steel industry.

The statistical model enables managers to estimate hidden regulatory costs and to make quantitative judgments about the benefits of developing more detailed costing systems. However, this study has several limitations. First, the estimates measure hidden costs at the margin. We do not estimate the average level of hidden cost, which is likely to be lower than marginal cost. Second, the estimated hidden costs are based on a statistical association between the variation in total costs and variations in the reported visible environmental costs, which does not establish causality. If firms systematically bundle environmental expenditures with expenses that either increase total cost (by improving safety or quality) or reduce total cost (through productivity improvements), then the hidden cost estimates will be biased. Third, the model is based on contemporaneous variations in total and regulatory costs, and does not incorporate learning effects that may reduce hidden costs in subsequent periods. Fourth, the cost of regulation is ideally the shadow price associated with a physical constraint imposed by regulation. We use regulatory expenditures as a single comprehensive proxy for a complex set of emission limits and standards. Finally, environmental costs may also lead to hidden benefits, such as improved quality, increased consumer appeal, and lower contingent liabilities, which our estimations do not capture.

Although we do not offer specific guidelines for setting up costing systems that track and help manage these hidden costs, recent reports by the USEPA (USEPA 1995; White et al. 1995) and the IMA (1996) provide an introduction to key concepts and techniques for developing environmental accounting systems.

In conclusion, environmental regulations are likely to play an increasingly important role in modern business. The scope and number of local, federal, and international regulations are rising, imposing significant costs on business. For example, USITC (1991) estimates that expenditures by U.S. steel producers to meet the requirements of the 1990 amendments to the Clean Air Act could add $17 per ton of raw steel, or more than 5 percent of the cost of production. Recognition of environmental regulation as an important cost driver, and formal incorporation of regulatory impacts in firms' accounting systems may be imperative for effective decision making. Further, regulators need to know the full costs of regulation to determine the best mix of regulation to benefit society as a whole.

APPENDIX

Survey of Pollution-Abatement Costs and Expenditures (PACE)

This survey provides comprehensive data on pollution-abatement capital expenditures, operating costs, and costs recovered by private industry. The United States Code, Title 13, authorized this survey, and required firms to respond and to certify that the response was substantially accurate.

The Census Bureau conducted PACE surveys annually from 1973 to 1993, except during the year 1987. Reported data are for activity during the survey calendar year. The respondents include most large mining firms, selected utility (electric and gas) and petroleum companies, and a sample of manufacturing establishments. The sampling universe for the manufacturing sector covers all manufacturing establishments with at least 20 employees. The PACE reports were based on a mail-out/mail-back survey of about 17,000 manufacturing establishments, and a supplemental survey of 500 mining, petroleum, and utility establishments. Manufacturing establishments were selected from a panel of participants in the Census of Manufactures, using a stratified probability procedure. Probability of selection is proportionate to the establishment's census value of shipments. New plants were added each year based on records from the Internal Revenue Service.

The format of the PACE survey has changed over the years, but the common data elements were as follows:

1. Annual operating costs for pollution abatement, including:
   a. Depreciation
   b. Labor
   c. Materials
   d. Supplies
   e. Fuel
   f. Electricity
   g. Services
   h. Equipment leasing
   i. Other costs
2. Total payments to governmental (Federal, State, county, local) units for:
   a. Public sewage services
   b. Municipal solid waste disposal
3. Total expenditures for new plant and equipment designed to abate air pollutants through end-of-line techniques.
4. Total expenditures for changes in production process to abate air pollutants.
5. Total expenditures for new plant and equipment designed to abate water pollutants through end-of-line techniques.
6. Total expenditures for changes in production process to abate water pollutants.
7. Total expenditures for new plant and equipment designed to abate solid-waste pollutants through end-of-line techniques.
8. Total expenditures for changes in production process to abate solid-waste pollutants.
9. Estimates of total expenditures to abate following pollutants by type of pollutant:
   a. Particulate
   b. Sulfur oxide
   c. Nitrogen oxide

Source: U.S. Census Bureau information and the PACE survey form MA-200 for various years.

d. Hydrocarbons
e. Lead
f. Hazardous air pollutants
g. Other pollutants

REFERENCES

Banker, R. D., and H. Johnston. 1993. An empirical study of cost drivers in the U.S. airline industry. *The Accounting Review* 68 (3): 576–601.

Barbera, A. J., and V. D. McConnell. 1990. The impact of environmental regulations on industry productivity: Direct and indirect effects. *Journal of Environmental Economics and Management* 18 (1): 50–65.

Barth, M. E., and M. F. McNichols. 1994. Estimation and market valuation of environmental liabilities relating to Superfund sites. *Journal of Accounting Research* 32 (Supplement): 177–209.

Berndt, E. R. 1996. *The Practice of Econometrics: Classic and Contemporary*. Reading, MA: Addison-Wesley.

Blacconiere, W. G., and D. M. Patten. 1994. Environmental disclosures, regulatory costs, and changes in firm value. *Journal of Accounting and Economics* 18 (3): 357–377.

———, and W. D. Northcut. 1997. Environmental information and market reactions to environmental legislation. *Journal of Accounting, Auditing and Finance* 12 (2): 149–178.

Byron, R. P., and A. K. Bera. 1983. Least squares approximations to unknown regression functions: A comment. *International Economic Review* 24 (1): 255–260.

Christensen, L. R., and D. W. Jorgenson. 1969. The measurement of U.S. real capital input, 1929–1967. *Review of Income and Wealth* 15 (December): 293–320.

———, ———, and L. Lau. 1973. Transcendental logarithmic production frontiers. *Review of Economics and Statistics* 55 (February): 28–45.

———, and W. H. Greene. 1976. Economies of scale in U.S. electric power generation. *Journal of Political Economy* 84 (4): 655–676.

Diewart, W. E. 1974. Applications of duality theory. In *Frontiers in Quantitative Economics*, Volume 2, edited by M. Intrigillator, and D. Kendrik, 106–171. Amsterdam, The Netherlands: North-Holland.

Ditz, D., J. Ranganathan, and R. D. Banks. 1995. *Green Ledgers: Case Studies in Corporate Environmental Accounting*. Washington, D.C.: World Resource Institute.

Epstein, M. 1996. *Measuring Corporate Environmental Performance*. Montvale, NJ: Institute of Management Accountants.

Foster, G., and S. M. Young. 1997. Frontiers of management accounting research. *Journal of Management Accounting Research* 9: 63–77.

Gray, W. B. 1987. The cost of regulation: OSHA, EPA and the productivity slowdown. *American Economic Review* 77 (5): 998–1006.

———, and R. J. Shadbegian. 1993. *Environmental Regulation and Manufacturing Productivity Growth at the Plant Level.* Discussion paper, U.S. Department of Commerce, Center for Economic Studies. Washington, D.C.: Government Printing Office.

Greene, W. H. 1993. *Econometric Analysis*. 2nd edition. New York, NY: Macmillan.

Guilkey, D. K., C. A. K. Lovell, and R. C. Sickles. 1983. A comparison of the performance of three flexible functional forms. *International Economic Review* 24 (3): 591–616.

Hall, R. E., and D. W. Jorgenson. 1967. Tax policy and investment behavior. *American Economic Review* 57 (3): 391–414.

Hughes, K. E. 2000. The value relevance of nonfinancial measures of air pollution in the electric utility industry. *The Accounting Review* 75 (2): 209–228.

Hulten, C. R., and F. C. Wykoff. 1981. The measurement of economic depreciation. In *Depreciation, Inflation, and the Taxation of Income from Capital*, edited by C. R. Hulten, 81–125. Washington, D.C.: The Urban Institute Press.

Institute of Management Accountants (IMA). 1996. *Tools and Techniques of Environmental Accounting for Business Decisions*. Statement 4Z. Montvale, NJ: IMA.

Jaffe, A. B., S. R. Peterson, P. R. Portney, and R. N. Stavins. 1995. Environmental regulation and the competitiveness of U.S. manufacturing: What does the evidence tell us? *Journal of Economic Literature* 33 (1): 132–163.

Jorgenson, D. W., and P. J. Wilcoxen. 1990. Environmental regulation and U.S. economic growth. *Rand Journal of Economics* 21 (2): 314–320.

———, and K. Yun. 1991. *Tax Reform and the Cost of Capital.* Oxford, U.K.: Claredon Press.

———, and R. Landau. 1993. *Tax Reform and the Cost of Capital: An International Comparison.* Washington, D.C.: Brookings Institution.

Landy, M. K., M. J. Roberts, and S. R. Thomas. 1990. *The Environmental Protection Agency: Asking the Wrong Questions.* New York, NY: Oxford University Press.

Lanen, W. N., and D. F. Larcker. 1992. Executive compensation contract: Adoption in the electric utility industry. *Journal of Accounting Research* 30 (1): 70–93.

Porter, M. E. 1991. America's green strategy. *Scientific American* 264 (4): 168.

Price Waterhouse LLP. 1994. *Progress on the Environmental Challenge: A Survey of Corporate America's Environmental Accounting and Management.* New York, NY: Price Waterhouse LLP.

Shephard, R. W. 1970. *The Theory of Cost and Production Functions.* Princeton, NJ: Princeton University Press.

U.S. Environmental Protection Agency (USEPA). 1995. *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms.* Office of Pollution Prevention and Toxics, June. Report No. EPA 742-R-95-001. Washington, D.C.: Government Printing Office.

U.S. International Trade Commission (USITC). 1991. *Steel Industry Annual Report on Competitive Conditions in the Steel Industry and Industry Efforts to Adjust and Modernize.* Report to the President. Investigation No. 332-289. Washington, D.C.: Government Printing Office.

———. 1994. *Metallurgical Coke: Baseline Analysis of the U.S. Industry and Imports.* Investigation No. 332-342. Washington, D.C.: Government Printing Office.

Varian, H. F. 1992. *Microeconomic Analysis.* 3rd edition. New York, NY: Norton.

White, A. L., D. E. Savage, J. Brody, D. Cavander, and L. Lach. 1995. *Environmental Cost Accounting for Capital Budgeting: A Benchmark Survey of Management Accountants.* U.S. Environmental Protection Agency. Report No. EPA742-R-95-005. Washington, D.C.: Government Printing Office.

THE ACCOUNTING REVIEW
Vol. 76, No. 2
April 2001
pp. 199–220

Engagement Planning, Bid Pricing, and Client Response in the Market for Initial Attest Engagements

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ABSTRACT: This study examines how client risk factors and the provision of additional services affect engagement planning and bid pricing for a set of initial engagement proposals that a single firm submitted to its prospective clients in 1997–1998. We find little effect of risk on planned personnel hours, but show that the firm responds to fraud and error risk factors by applying engagement-planning strategies such as assigning more high-risk specialist personnel, assigning more industry expert personnel, applying more intensive testing, and/or performing additional review. Analyzing proposed fees while controlling for planned personnel hours, we find risk premia for both fraud and error risk factors. Supplemental analysis of accepted vs. rejected bids shows that the risk premia are detectable for bids accepted by clients (i.e., the engagements the firm will actually perform), implying that risk premia are not bid away in the market. We also find that for clients purchasing additional services, the firm plans more hours and uses industry experts more often. Results reveal a relatively small fee premium for additional services clients across all bids, but analysis of accepted vs. rejected bids implies that this premium is bid away in the market.

Keywords: *additional services; bid pricing; audit planning; risk evaluation; risk adaptation; SAS No. 82.*

Data Availability: *Data used for this study are derived from a proprietary database.*

The cooperation of the firm providing data for this project and the advice of firm personnel who assisted us are greatly appreciated. We thank participants of the New England Behavioral Accounting Research Series, the 2000 AAA Auditing Section Midyear Meeting, and research workshops at Northeastern University, the University of Kansas, and the University of Wisconsin–Madison. We also acknowledge the helpful comments of Bob Allen, Jim Bierstaker, Qiang Cheng, Allen Craswell, Larry Davis, John Eichenseher, Mike Ettredge, Haim Falk, Jed Frees, Lisa Millici Gaynor, Dana Hermanson, Mario Maletta, Jim Maroney, Margie Platt, Larry Rittenberg, Tim Rupert, Mike Stein, Greg Trompeter, Terry Warfield, Arnie Wright, and three anonymous referees.

Submitted September 1999
Accepted November 2000

I. INTRODUCTION

This paper provides empirical evidence on the effects of fraud risk, error risk, and provision of additional services on planning and pricing of initial attest engagements. This analysis extends prior archival research using a unique sample of recent engagement bids made by a single firm.[1] The data include client and market information that the firm used to estimate planned personnel hours and to set the proposed fee for these bids. Further, the data reveal whether prospective clients accepted or rejected the firm's bids, allowing us to separate the firm's pricing behavior from the clients' decisions. Thus, we provide insight into the operation of the market not available from the study of accepted bids, which has been the basis for similar research in the past.

Our first objective is to examine the effects that client risk factors have on engagement planning and pricing. Despite reliance on a risk-based approach in U.S. auditing standards and widespread evidence of litigation against auditors, results of prior research are mixed. Archival studies have failed to detect consistent relationships between risk and audit effort (e.g., Bedard 1989; Mock and Wright 1993, 1999). Further, even in studies reporting that higher audit risk leads to more effort, there is little evidence that audit firms charge risk premia (i.e., a premium for riskier clients beyond the fee needed to compensate for extra effort) (e.g., O'Keefe et al. 1994; Bell et al. 2000). One explanation for these mixed findings is that the lack of direct *ex ante* risk measures has limited the detection of risk effects using archival data (Houston et al. 1999; Bell et al. 2000). Lacking *ex ante* risk measures, researchers must infer risk assessments from client data or elicit them after audit completion (possibly from someone other than the individual actually making planning and pricing decisions). Further, it is difficult to detect risk premia without data on both effort and fees, as price differentials may simply compensate for effort alone. This study overcomes these limitations, as our data contain *ex ante* fraud and error risk evaluations made by the engagement team, consistent with Statement on Auditing Standards No. 82 (AICPA 1997; hereafter SAS No. 82), as well as planned personnel hours and proposed fees. These data allow us to conduct more powerful tests of risk effects.

Our second objective is to investigate whether providing additional services (e.g., management and tax advisory services) to prospective clients affects engagement planning and pricing. As the economic importance of these services to audit firms has grown, regulators have expressed increasing concern about their impact on the profession. The SEC has expressed concern that providing additional services to clients impairs perceived and actual auditor independence, particularly if audit fees are discounted to retain these clients (e.g., Levitt 1999, 2000).[2]

In contrast to the SEC's concern, most prior research concludes that when auditors perform additional services for their clients, fees charged for the audit engagement are actually higher rather than lower (e.g., Simunic 1984; Simon 1985). One explanation for this differential is that auditors in such engagements are seeking compensation for additional effort associated with characteristics of the clients who purchase additional services (Simunic 1984; Palmrose 1986b; Solomon 1990). Alternatively, auditors may be capitalizing on existing client relationships, and charging fee premia beyond compensation for additional effort (e.g., Simunic 1984). These alternative explanations have differing implications for auditor independence, because revenues that compensate for actual effort are unlikely to compromise an auditor's independence. To address this issue, we investigate whether provision of additional services affects effort (measured as planned personnel hours), and whether proposed fees for these engagements differ after controlling for effort.

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[1] A confidentiality agreement precludes identification of the firm.

[2] Similarly, the Independence Standards Board's Conceptual Framework (ISB 2000, para. 35) says: "Concerns about the potential pressures on auditor independence created by the rapid growth in consulting and other non-audit services have been discussed widely in the auditing literature. For example, the AICPA's Special Committee on Financial Reporting (Jenkins Committee) noted that users of financial statements 'are concerned that auditors may accept audit engagements at marginal profits to obtain more profitable consulting engagements. Those arrangements could motivate auditors to reduce the amount of audit work and to be reluctant to irritate [auditee] management to protect the consulting relationship.' "

Our results show that error risk factors have a small effect on engagement effort, but that fraud risk factors have no effect on effort. At this stage in engagement planning, risk factors are associated with differences in personnel assignment and evidence collection strategies, but with little change in the total personnel budget. For example, engagement teams more often plan to use high-risk specialist personnel for clients with fraud and error risk factors, and more often plan additional review for clients with fraud risk factors. The firm plans intensive testing more frequently for clients with error risk factors, but not for clients with fraud risk factors. These findings provide the first archival evidence that auditors adopt different strategies when faced with fraud vis-à-vis error risk, consistent with SAS No. 82. Further, both fraud and error risk factors are associated with risk premia in the set of submitted bids, after controlling for effort. By separately modeling proposed fees for bids that clients accepted vs. those that they rejected, we find risk premia for both fraud and error risk among accepted bids. This implies that market forces do not reduce the firm's ability to charge risk premia.

Our results also show that the firm plans more effort for clients purchasing additional services, and proposes a small but significant fee premium after controlling for the incremental effort. Supplementary analysis reveals no evidence that additional services clients have problems that might lead the firm to plan more effort or seek a higher fee. However, we do find more frequent use of industry experts, which may imply assignment of engagement personnel who can better integrate the multiple services provided. When we analyze the accepted bid group separately, no fee premium remains. This suggests that while the firm may try to charge a premium, the implied promise of cross-service synergy does not induce clients to pay a higher fee. In sum, the results of our analysis of accepted vs. rejected bids imply that fee premia charged for additional services are bid away in the market, while risk premia remain.

II. PRIOR LITERATURE AND HYPOTHESES

Effects of Fraud and Error Risk on Planned Effort and Proposed Fees

Auditing standards (e.g., SAS No. 47, AICPA 1983; SAS No. 82, AICPA 1997) suggest that auditors should respond to risk by altering the nature, timing, and/or extent of audit procedures. The engagement fee should reflect these actions, if they require more effort and/or involve personnel with greater general and/or specialized experience. However, these actions may not fully protect against future litigation losses; for example, collusion by client management may prevent normal audit procedures from detecting fraud. Thus, firms may charge higher-risk clients a premium, beyond the fee needed to compensate for extra effort on the engagement.

Prior research on auditors' responses to client risks in planning and pricing engagements provides mixed findings. Archival studies of audit workpapers, including Bedard (1989) and Mock and Wright (1993, 1999), find that audit plans are relatively unresponsive to changes in risk. Similarly, Hackenbrack and Knechel (1997) find no relation between internal control reliance decisions and audit effort. However, O'Keefe et al. (1994) find that inherent risk affects senior and staff hours used in the audit. They also find that audit fees are higher for riskier clients, but because their fee model does not control for effort, it is not clear whether there is a risk premium or whether the higher fee represents compensation for the observed increase in hours. Simunic and Stein (1996), further analyzing the same data, conclude that the firm they study addresses increased risk via additional effort rather than through a risk premium. Bell et al. (2000) report a similar finding. In contrast, Davis et al. (1993) find some support for a risk premium; high inherent risk has a marginal effect in some models, but moderate risk is never significant. Thus, the archival literature to date does not reach a consensus as to whether client risk is associated either with systematic increases in effort or with risk premia, or both.

In contrast, behavioral studies more often detect effects of risk on audit effort decisions (e.g., Libby et al. 1985; Maletta and Kida 1993; Zimbelman 1997), but relatively few examine engagement pricing. In a study of client acceptance decisions, Johnstone (2000) finds that audit partners recommend higher audit effort and fees in response to higher client business risk (i.e., risk of business failure) and auditor business risk (risk of loss from litigation, or declines in reputation or engagement profitability). Similarly, Pratt and Stice (1994) find that auditors plan increased audit effort for clients in deteriorating financial condition. Although Pratt and Stice (1994) do not find risk premia for the client's business risk, they do show that auditors price factors that affect the audit firm's business risk. In a related study, Houston et al. (1999) find that auditors' planning and pricing decisions differ in the presence of detected errors vs. fraud. Participants in their study seek risk premia upon discovering evidence consistent with fraud, but not when they find evidence of an error. This suggests that audit firms use different strategies to contain fraud vis-à-vis error risk.

Professional guidance suggests that client risk should lead the auditor to plan more hours and/or to charge a risk premium, yet prior research reports inconsistent findings regarding these effects. This study can help resolve these inconsistent findings because it uses *ex ante* direct measures of client risk that engagement teams develop as they structure the bids. These features should enable a more powerful test for risk effects in both effort and pricing decisions, relative to prior research. Thus, we propose the following directional hypotheses:

H1a: Planned personnel hours will be higher for clients with fraud risk factors.

H1b: After controlling for planned personnel hours, proposed fees will be higher for clients with fraud risk factors.

H2a: Planned personnel hours will be higher for clients with error risk factors.

H2b: After controlling for planned personnel hours, proposed fees will be higher for clients with error risk factors.

Effects of Providing Additional Services on Planned Effort and Proposed Fees

Advantages of auditors offering additional services (e.g., management and tax advisory services) include possible efficiency gains and quality improvement through knowledge spillovers across services (e.g., Simunic 1984). In contrast, the SEC recently argued against auditor provision of joint services (e.g., Levitt 1999, 2000) on the basis that audit firms may reduce audit effort, fees, and quality if they seek more profitable consulting engagements with their clients.

Early research finds that clients purchasing additional services pay higher fees, on average (e.g., Simunic 1984; Simon 1985). This finding suggests that clients are willing to pay for increased quality associated with knowledge spillovers across services. However, Palmrose's (1986b) and Turpen's (1990) evidence that audit fees are also higher for clients receiving advisory services from other firms *not* doing the audit casts doubt on the validity of the knowledge spillover explanation. Simunic (1984) and Palmrose (1986b) both note that higher fees charged to additional services clients may be at least partially due to increased effort associated with systematic differences in these clients (see also Solomon 1990; Yardley et al. 1992). One source of systematic differences among additional services clients is that they may be experiencing problem that require advice from audit firms. These client problems may indicate greater risk, and a need to apply more audit effort to achieve target assurance. Another possibility is that clients purchasing additional services may be undergoing organizational changes, and thus may require more effort in planning the audit engagement and interpreting its results.

Research helpful in differentiating these possible explanations analyzes various measures of audit effort. Davis et al. (1993) address this issue by showing that auditors expend more total effort for additional services clients, even after controlling for differences in inherent risk. This evidence is inconsistent with the "client problems" explanation, at least to the extent that client problems are measured by the inherent risk judgment. Davis et al. (1993) also find no effect of additional services on audit fees, after controlling for effort differences, implying that compensation to the firm for these engagements merely covers incremental labor costs.[3] In contrast, O'Keefe et al. (1994) find that the provision of additional services is not associated with differences in hours assigned to any of four audit personnel classifications, and they also do not find a fee premium for additional services clients. A more recent study of audit effort by Hackenbrack and Knechel (1997) separates engagement hours by activity and rank. They find that additional services clients require more partner and manager effort in the planning and interpretation stages of the engagement. Hackenbrack and Knechel (1997) conclude that their evidence is more consistent with the "organizational change" than the "client problems" explanation for the greater effort applied to audit engagements of clients purchasing additional services.

In summary, research on additional services yields mixed results. Although earlier studies find these clients pay higher fees, studies published in the early 1990s show no differences in the pricing of these engagements. Research that measures audit effort applied to additional services clients finds either increased effort (Davis et al. 1993) or no difference (O'Keefe et al. 1994), whereas Hackenbrack and Knechel (1997) find increases in effort for some audit activities. Based on this body of prior evidence, we propose the following hypotheses:

H3a: Planned personnel hours will be higher for additional services clients.

H3b: After controlling for planned personnel hours, proposed fees will be higher for additional services clients.

Client's Response: Accepted vs. Rejected Bids

In the audit market, firms select clients on which to bid, and determine the appropriate planned effort and proposed fees for those bids. Next, the client either accepts or rejects the submitted bid, basing that decision primarily on price and perceived quality (Simunic and Stein 1990; Elitzur and Falk 1996). Accepted bids become the set of actual engagements, which make up the sample populations that archival studies typically examine. Analysis of the entire set of submitted bids, whether accepted or not accepted, yields insight on factors that firms *attempt* to price. However, prospective clients may accept or reject the bid. Thus, separate examination of the bids that clients accept vs. those that they reject provides evidence on how the market responds to the firm's pricing decisions.

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[3] After controlling for possible selection bias in the client's decision to purchase additional services, Abdel-khalik (1990) finds no evidence that audit fees are higher for these clients.

For example, we note above that few prior archival studies find evidence of risk premia. These studies investigate *accepted* bids. Thus, they cannot distinguish between two possibilities. First, a given firm may not attempt to price risk; if so, then we should observe no effect of risk for its *submitted* bids. Alternatively, a firm may attempt to charge a risk premium, but market forces may prevent it from obtaining those clients (i.e., other firms of equivalent quality are bidding lower). If so, then we should observe a risk premium for bids that firms *submit*, but not for bids that clients *accept.*

The first possibility suggests that audit firms should more closely monitor their partners' bid pricing, and/or develop pricing policies to ensure adequate compensation for risk. The second implies that risk evaluation and/or pricing differs across firms, such that risky clients are able to obtain audits from other firms at lower prices. Similarly, failure to find a price differential for additional services clients (e.g., O'Keefe et al. 1994) may imply either that the firm is not attempting to charge a fee premium for these engagements, or that competitive market forces prevent an attempt to bid them up. To provide initial evidence on how client action affects one firm's pricing strategies, we analyze engagement pricing for the sets of bids accepted vs. those rejected by clients, comparing effects of risk and additional services between these groups of clients.

II. METHODS

Sample

The data for this study include actual evaluations of prospective clients from the participating firm's engagement proposal documentation. From this file, we obtained information regarding the population of 508 clients for whom the firm issued a bid between November 1997 and August 1998, and for which the client's bid acceptance or bid rejection decision was contained in the file at the time we obtained the data. We exclude 172 clients due to missing data (primarily financial), leaving a sample of 336 for empirical tests.

Variable Definitions

Our primary empirical tests concern how fraud and error risk and the provision of additional services affect planned effort and the proposed fee. Dependent variables in the models are the natural log of HOURS (total planned personnel hours for all classes of professionals) and the natural log of PROPOSED FEE (the bid price, which is set on a fixed, not an hourly, basis).

Risk and Additional Services Variables

As part of the proposal process, the firm makes *ex ante* assessments of client risks related to fraud and errors. Specifically, engagement teams complete a checklist of approximately 20 fraud risk factors and 15 error risk factors.[4] Firm personnel evaluate the prospective client and indicate a "yes" or a "no" for the presence of each risk factor. Fraud risk factors are similar to those identified in SAS No. 82 (e.g., factors related to management integrity). Error risk factors relate to the client's control environment, and include items such as the complexity of the client's transactions. The checklist separates the fraud and error risk factors. Our dichotomous FRAUD RISK and ERROR RISK variables indicate identification of at least one risk factor in the respective category. ADDITIONAL SERVICES is a dichotomous variable indicating whether the firm provides other services to the client.[5]

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[4] The participating firm has requested that we not fully disclose the specific risk factors.

Control and Industry Variables

To assess the effects of FRAUD RISK, ERROR RISK, and ADDITIONAL SERVICES on HOURS and PROPOSED FEE, we control for other factors that may affect engagement planning and pricing. For example, larger clients may require more "transaction-specific" investment (e.g., coordinating between offices of the audit firm, learning about a more complex entity, etc.) and increase the firm's business risk (via litigation or reputation declines) relative to smaller clients. Consistent with prior research (e.g., Palmrose 1986a, 1986b; Francis and Simon 1987; O'Keefe et al. 1994; Davidson and Gist 1996), we expect a positive relationship between client size (ASSETS) and both effort and proposed fees.[6]

The model also includes indicators of the client's business risk. Because a higher client business risk increases the audit firm's business risk, audit firms may apply more effort with financially weak clients to attain a target level of assurance (O'Keefe et al. 1994; Houston et al. 1999; Bell et al. 2000; Johnstone 2000). In addition, the threat of litigation associated with client business failure may motivate audit firms to conduct engagements in a more defensible manner (Simon 1985; Stice 1991; Stein et al. 1994; Simunic and Stein 1996). Based on prior research (e.g., O'Keefe et al. 1994), we expect that LEVERAGE (total liabilities divided by total assets) will directly affect both hours and proposed fees. Correspondingly, higher ROA (net income divided by total assets) will inversely affect hours and proposed fees (Stein et al. 1994). We also include CASHFLOW (net operating cash flows divided by total assets), a variable relatively unstudied in the fee literature but of obvious importance to business viability. As a viability measure, CASHFLOW is likely to be inversely related to hours and fees, similar to ROA. However, Gul and Tsui (1998) find a *direct* relationship of cash flow to audit fees, which they attribute to increased agency costs and/or greater ability to pay. Thus, we are unable to predict the direction of the relation between CASHFLOW and proposed fees.

Both models also include the dichotomous variable PUBLIC, which controls for expected increases in hours and fees due to the additional activities and risk associated with audit engagements of public companies (Palmrose 1986a, 1986b, 1989; O'Keefe et al. 1994; Simunic and Stein 1996; Hackenbrack and Knechel 1997).[7] MULTIPLE LOCATIONS, a dichotomous variable measuring whether the client operates at single or multiple sites, controls for differences in hours and fees related to the fact that geographically dispersed clients are more complex and may be riskier (e.g., Palmrose 1986a, 1986b; 1989; Francis and Simon 1987; Simon and Francis 1988; Davidson and Gist 1996; Behn et al. 1999).[8] PEAK, a dichotomous variable indicating whether the client has a December 31 year-end, controls for possible reductions in planned effort and increases in fees for work performed during the busy season (e.g., Francis 1984; Palmrose 1989). Further, because prior research (Stein et al. 1994; Hackenbrack and Knechel 1997) identifies industry differences in audit effort and/or fees, both models include industry-specific dichotomous control variables. Finally, the proposed fee model includes planned hours as a control variable because audit fees should increase with planned hours (Davis et al. 1993; Pratt and Stice 1994; Houston et al. 1999).

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[5] The data used for this study disclose only whether the firm provides additional services, not the nature or the amount of the fee for those services. Firm representatives tell us that these services are predominantly consulting and tax advice. Other studies (e.g., Palmrose 1986b; Davis et al. 1993; O'Keefe et al. 1994) separate the effects of tax and consulting, but report few differences in effort or pricing across types of service.

[6] Financial variables are winsorized at +/− three standard deviations.

[7] Prior evidence on related control variables is not uniform. For example, Stein et al. (1994) find that client losses are associated with higher fees, while Francis (1984) does not. Also, Davidson and Gist (1996) find no effect of return on equity on hours. O'Keefe et al. (1994) find that public clients require more hours, but Davis et al. (1993) do not report such an effect.

Models of Planned Personnel Hours and Proposed Fees

We model the natural log of planned hours and proposed fees as a function of risk, additional services, industry, and control variables:[9]

$$\begin{aligned}\ln(\text{HOURS}) = {} & a_0 + a_1\,\text{FRAUD RISK} + a_2\,\text{ERROR RISK}\\ & + a_3\,\text{ADDITIONAL SERVICES} + a_{4\text{–}9}\,(\text{INDUSTRY VARIABLES})\\ & + a_{10}\ln(\text{ASSETS}) + a_{11}\text{LEVERAGE}\\ & + a_{12}\,\text{CASHFLOW} + a_{13}\,\text{ROA}\\ & + a_{14}\,\text{PUBLIC} + a_{15}\,\text{MULTIPLE LOCATIONS}\\ & + a_{16}\,\text{PEAK} + u; \end{aligned} \tag{1}$$

$$\begin{aligned}\ln(\text{PROPOSED FEE}) = {} & b_0 + b_1\,\text{FRAUD RISK} + b_2\,\text{ERROR RISK}\\ & + b_3\,\text{ADDITIONAL SERVICES}\\ & + b_{4\text{–}9}\,(\text{INDUSTRY VARIABLES})\\ & + b_{10}\ln(\text{ASSETS}) + b_{11}\,\text{LEVERAGE}\\ & + b_{12}\,\text{CASHFLOW} + b_{13}\,\text{ROA} + b_{14}\,\text{PUBLIC}\\ & + b_{15}\,\text{MULTIPLE LOCATIONS} + b_{16}\,\text{PEAK}\\ & + b_{17}\ln(\text{HOURS}) + u'; \end{aligned} \tag{2}$$

where:

HOURS = planned personnel hours;
PROPOSED FEE = proposed engagement fee;
FRAUD RISK = 1 if at least one fraud risk factor, 0 otherwise;

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[8] Prior related research often uses the ratios of inventory and/or receivables to total assets to measure client complexity. The participating firm's database does not provide information on specific current assets, but does indicate total working capital. Including the ratio of working capital to total assets does not change results of either model, so this variable is not included in the study. Other variables sometimes appearing in studies of audit hours and fees include the number and nature of client subsidiaries, the number of reports in the engagement, and the client's internal audit function. The participating firm's database does not include these variables.

[9] Consistent with prior research (Davis et al. 1993; Houston et al. 1999), we assume that the planned hours and proposed fees models are recursive, and so OLS is appropriate (e.g., Gujarati 1988, 596). Supporting this approach, we find that the error terms of Models (1) and (2) are uncorrelated. Our approach is consistent with the sequence of effort and pricing decisions in the firm's documentation, and with auditing standards, which direct that sufficient competent evidence be gathered to achieve assurance. An alternative approach, using the residuals from a regression of HOURS on the other independent variables in the proposed fees model, yields identical inferences.

ERROR RISK = 1 if at least one error risk factor, 0 otherwise;
ADDITIONAL SERVICES = 1 if the firm provides additional services, 0 otherwise;
HIGH TECH = 1 if member of high technology industry, 0 otherwise;
GOVERNMENT/NONPROFIT = 1 if member of government/nonprofit industry, 0 otherwise;
MANUFACTURING = 1 if member of manufacturing industry, 0 otherwise;
RETAIL = 1 if member of retail industry, 0 otherwise;
FINANCIAL SERVICES = 1 if member of financial services industry, 0 otherwise;
NATURAL RESOURCES = 1 if member of natural resources industry, 0 otherwise;
ASSETS = total assets (in thousands);
LEVERAGE = total liabilities ÷ total assets;
CASHFLOW = cash flow from operations ÷ total assets;
ROA = net income ÷ total assets;
PUBLIC = 1 if publicly held, 0 otherwise;
MULTIPLE LOCATIONS = 1 if significant operations at multiple locations, 0 otherwise;
PEAK = 1 if December 31 year-end, 0 otherwise;
u = error term.

Positive coefficients on the risk and additional services variables in Models (1) and (2) support the research hypotheses. In addition to testing these hypotheses, we perform supplementary analysis comparing effects of FRAUD RISK, ERROR RISK, and ADDITIONAL SERVICES on proposed fees between the groups of prospective clients that accepted and rejected the firm's bid. We compare these groups using Model (3), which expands Model (2) to include REJECTED, a dichotomous variable set to 0 for clients that accepted the firm's bid, and set to 1 for those that rejected the bid (Fisher 1970).

$$\begin{aligned}\ln(\text{PROPOSED FEE}) = {} & \beta_0 + \beta_1\,\text{REJECTED} + \beta_2\,\text{FRAUD RISK} \\ & + \beta_3\,\text{FRAUD RISK} \times \text{REJECTED} \\ & + \beta_4\,\text{ERROR RISK} + \beta_5\,\text{ERROR RISK} \\ & \times \text{REJECTED} + \beta_6\,\text{ADDITIONAL SERVICES} \\ & + \beta_7\,\text{ADDITIONAL SERVICES} \\ & \times \text{REJECTED} + \beta_{8-13}\,(\text{INDUSTRY VARIABLES}) \\ & + \beta_{14}\ln(\text{ASSETS}) + \beta_{15}\,\text{LEVERAGE} \\ & + \beta_{16}\,\text{CASHFLOW} + \beta_{17}\,\text{ROA} + \beta_{18}\,\text{PUBLIC} \\ & + \beta_{19}\,\text{MULTIPLE LOCATIONS} \\ & + \beta_{20}\,\text{PEAK} + \beta_{21}\ln(\text{HOURS}) + u''. \end{aligned} \qquad (3)$$

Model (3) includes interactions of REJECTED with FRAUD RISK, ERROR RISK, and ADDITIONAL SERVICES. We use these interactions to determine whether the expected fee premia persist in bids accepted by clients. If a premium is not evident for the risk and additional services variables in the bids accepted (i.e., if the main effects are not significant), and if these variables' interactions with REJECTED are positive and significant, then we infer that clients charged premia reject the firm's bids.

IV. RESULTS

Descriptive Statistics

Table 1 presents descriptive statistics. Panel A describes dichotomous variables, Panel B describes continuous variables, and Panel C compares descriptive statistics for our sample with those of other studies. Panel A shows that 19.9 percent of the prospective clients in our sample had at least one fraud risk factor, 22.3 percent had at least one error risk factor, and 16.7 percent of potential clients purchase additional services beyond the engagement. Panel B shows that the mean proposed fee is $46,219, which Panel C shows falls within

TABLE 1
Descriptive Statistics

Panel A: Dichotomous Variables

Variable	*Variable Description*	$n = 1$ (*Percent*)	$n = 0$ (*Percent*)
FRAUD RISK	= 1 if at least one fraud risk factor is identified for client; 0 otherwise.	67 (19.9)	269 (80.1)
ERROR RISK	= 1 if at least one error risk factor is identified for client; 0 otherwise.	75 (22.3)	261 (77.7)
ADDITIONAL SERVICES	= 1 if the firm provides other additional services to the client; 0 otherwise.	56 (16.7)	280 (83.3)
PUBLIC	= 1 for publicly held companies; 0 otherwise.	45 (13.4)	291 (86.6)
MULTIPLE LOCATIONS	= 1 for significant operations at multiple locations; 0 otherwise.	41 (12.2)	295 (87.8)
PEAK	= 1 for December 31 year-end; 0 otherwise.	208 (61.9)	128 (38.1)
HIGH TECH	= 1 for information technology, software development, or Internet commerce companies; 0 otherwise.	90 (26.8)	246 (73.2)
GOVERNMENT/ NONPROFIT	= 1 for health care, higher education, nonprofit, or state/local governmental clients; 0 otherwise.	73 (21.7)	263 (78.3)
SERVICE	= 1 for hospitality, entertainment, media, telecommunications, or transportation companies; 0 otherwise.	48 (14.3)	288 (85.7)
MANUFACTURING	= 1 for automotive, engineering, construction, or pharmaceutical companies; 0 otherwise.	45 (13.4)	291 (86.6)
RETAIL	= 1 for consumer products or retail distribution companies; 0 otherwise.	32 (9.5)	304 (90.5)
FINANCIAL SERVICES	= 1 for banks or insurance, investment, or real estate clients; 0 otherwise.	37 (11.0)	299 (88.9)
NATURAL RESOURCES	= 1 for mining, oil and/or gas companies; 0 otherwise.	11 (3.3)	325 (96.7)

(*Continued on next page*)

TABLE 1 (Continued)

Panel B: Continuous Variables

Variable	*Variable Description*	*Mean (Median)*	*Standard Deviation*	*Minimum (Maximum)*
PROPOSED FEE	Proposed engagement fee	\$46,219 (\$25,000)	\$155,238	\$2,000 (\$2,700,000)
HOURS	Planned personnel hours	443.8 (272.5)	1,155.6	10 (20,000)
ASSETS	Total assets (in thousands)	\$258,000 (\$8,117)	\$1,079,573	1 (\$9,714,239)
LEVERAGE	Total liabilities ÷ Total assets	0.66 (0.55)	0.75	0 (5.76)
CASHFLOW	Cash flow from operations ÷ Total assets	−0.08 (0.04)	0.80	−4.89 (3.11)
ROA	Net income ÷ Total assets	−0.08 (0.03)	2.98	−20.57 (32.91)

Panel C: Comparison with Other Studies[a]

Variable	*O'Keefe et al. (1994)*	*Davis et al. (1993) (Additional Services)*	*Davis et al. (1993) (No Additional Services)*	*Bell et al. (2000)*
Mean fees	\$107,169	\$55,000	\$28,900	\$52,000
Mean hours	1,636	727	438	839
Mean assets (000)	\$151,753	\$56,837	\$12,350	\$150,313
Mean leverage	0.68	NA		0.72
Percent public	20%	NA		17%
Industry makeup	High tech, manufacturing, merchandising	Broad		Broad
Sample period	1989	1988–89		1989

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[a] This panel compares descriptive data for this study's sample with that of several other related studies' samples. Davis et al. (1993) present descriptive data for subsamples of clients purchasing and not purchasing additional services from their auditor. The Davis et al. (1993) sample was structured to contain at least as many public as nonpublic clients; the actual proportion of public clients is not disclosed.

the range of prior studies. The mean number of planned personnel hours is 444, at the low end of the range of prior research. This may be due to efficiency pressures and improved technology in the industry during the 1990s. Mean total assets is \$258,000,000, larger than in comparison studies. Mean leverage is 0.66, similar to O'Keefe et al. (1994) and Bell et al. (2000), while our percentage of public clients (13 percent) is somewhat lower than theirs (20 and 17 percent, respectively).

The means (and medians) of CASHFLOW and ROA are virtually zero in our sample, which may appear somewhat puzzling given the strong economic climate during 1997–98. Because of the predominance of start-up businesses in the high-technology industry during the sample period, we investigate whether the relatively low performance of our sample as a whole is driven by the high-technology sector. The mean CASHFLOW is −0.576 for our high-technology clients, and 0.096 for other clients ($t = 4.732$, $p = 0.000$). The mean ROA is −0.45 for our high-technology clients, and 0.06 for other clients ($t = 1.399$, $p = 0.082$). These results indicate that the average financial performance of our sample as a whole is reduced by low returns in the high-technology industry.

Model of Planned Personnel Hours

Fraud and Error Risk

Model (1) regresses planned personnel hours on risk, additional services, industry and other control variables.[10] Table 2 shows that the model is significant ($F = 7.65$, $p < 0.001$), explaining 24.1 percent of the variation in planned hours.[11] FRAUD RISK has no effect on planned personnel hours; therefore, H1a is not supported.[12] However, ERROR RISK is associated with a marginally significant increase in planned personnel hours ($t = 1.299$, $p < 0.10$), providing limited support for H2a. The coefficient of 0.148 on ERROR RISK implies that the firm plans about 16 percent more hours for clients with an error risk factor.

While we find weak effects of risk on planned personnel hours, engagement teams have alternative ways to respond to risk. Specifically, the proposal documentation captures intentions to apply specific risk-containment strategies, including plans to use high-risk client specialists or industry experts, add a layer of review, or apply more intensive testing (e.g., emphasizing substantive tests, year-end testing, and/or larger sample sizes).

Table 3 shows how the firm's intended use of these strategies differs for clients with fraud and error risk factors. For clients with fraud risk, engagement teams more often plan to use high-risk specialists (19.4 vs. 9.7 percent; $p = 0.026$) and additional review (11.9 vs. 3.0 percent; $p = 0.002$). These strategies add relatively few hours to the engagement budget, but provide alternative means of controlling risk. In contrast, proposals for clients with fraud risk factors do not differ in use of industry experts, or in planned testing intensity. The absence of a planned increase in testing intensity implies that at this early stage in

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[10] The models do not violate OLS regression assumptions. The Breusch-Pagan test (Breusch and Pagan 1979) reveals no heteroskedasticity. Variance inflation factors and condition indices indicate no collinearity problems (Belsley et al. 1980).

[11] While Model (1) is highly significant, its explanatory power is lower than in prior research. The functional forms employed by Simunic (1980), O'Keefe et al. (1994), and Davidson and Gist (1996) do not improve explanatory power. Other possible explanations that might account for the lower explained variance in hours include: (1) economic changes, for example the declining ability of asset cost to represent company size and complexity, especially in the high-technology sector; (2) changes in the audit industry, including the new audit approaches used by many firms; and (3) idiosyncrasies of our data, including the nature of our sample (initial engagements) or our measures (e.g., planned, not actual, hours). Future research on actual engagements conducted during the late 1990s would help distinguish among these explanations.

[12] We coded FRAUD RISK and ERROR RISK as dichotomous variables because very few clients have more than one fraud (4.5 percent) or error (3.6 percent) risk factor. When these variables are continuous, ERROR RISK becomes insignificant in the hours model. Other results of Model (1) and all results of Models (2) and (3) are unchanged. The only difference in Table 3 results is that the use of an additional layer of review becomes significantly higher for clients with ERROR RISK ($p = 0.02$)

TABLE 2

Regressions of Planned Personnel Hours and Proposed Fees on Risk, Client Purchases of Additional Services, Industry and Control Variables

$$
\begin{aligned}
(1)\ \ln(\textit{HOURS}) = {} & a_0 + a_1\,\textit{FRAUD RISK} + a_2\,\textit{ERROR RISK} + a_3\,\textit{ADDITIONAL SERVICES} \\
& + a_{4\text{–}9}\,(\textit{INDUSTRY VARIABLES}) + a_{10}\,\ln(\textit{ASSETS}) + a_{11}\,\textit{LEVERAGE} \\
& + a_{12}\,\textit{CASHFLOW} + a_{13}\,\textit{ROA} + a_{14}\,\textit{PUBLIC} + a_{15}\,\textit{MULTIPLE LOCATIONS} \\
& + a_{16}\,\textit{PEAK} + u
\end{aligned}
$$

$$
\begin{aligned}
(2)\ \ln(\textit{PROPOSED FEE}) = {} & b_0 + b_1\,\textit{FRAUD RISK} + b_2\,\textit{ERROR RISK} \\
& + b_3\,\textit{ADDITIONAL SERVICES} + b_{4\text{–}9}\,(\textit{INDUSTRY VARIABLES}) \\
& + b_{10}\,\ln(\textit{ASSETS}) + b_{11}\,\textit{LEVERAGE} + b_{12}\,\textit{CASHFLOW} \\
& + b_{13}\,\textit{ROA} + b_{14}\,\textit{PUBLIC} + b_{15}\,\textit{MULTIPLE LOCATIONS} \\
& + b_{16}\,\textit{PEAK} + b_{17}\,\ln(\textit{HOURS}) + u'
\end{aligned}
$$

	Model (1): ln(HOURS)		*Model (2): ln(PROPOSED FEE)*	
Variable	*Predicted Sign*	*Cofficient t-statistic*	*Predicted Sign*	*Coefficient t-statistic*
Intercept		4.287*** (17.923)		4.959*** (24.387)
FRAUD RISK	+	−0.051 (−0.437)	+	0.166*** (2.358)
ERROR RISK	+	0.148* (1.299)	+	0.147** (2.137)
ADDITIONAL SERVICES	+	0.372*** (3.153)	+	0.111* (1.552)
Industry Control Variables				
HIGH TECH	?	−0.121 (−0.815)	?	−0.291*** (−3.264)
NATURAL RESOURCES	?	−0.163 (−0.595)	?	−0.299* (−1.817)
GOVERNMENT/ NONPROFIT	?	−0.023 (−0.149)	?	0.091 (0.976)
MANUFACTURING	?	0.035 (0.184)	?	0.081 (0.809)
RETAIL	?	0.174 (0.963)	?	0.063 (0.580)
FINANCIAL SERVICES	?	−0.001 (−0.004)	?	0.063 (0.596)

(*Continued on next page*)

TABLE 2 (Continued)

	Model (1): ln(HOURS)		*Model (2): ln(PROPOSED FEE)*	
Variable	*Predicted Sign*	*Cofficient t-statistic*	*Predicted Sign*	*Coefficient t-statistic*
Other Control Variables				
ln(ASSETS)	+	0.135*** (6.830)	+	0.060*** (4.704)
LEVERAGE	+	0.083 (1.156)	+	0.021 (0.489)
CASHFLOW	−	0.009 (0.126)	?	0.200*** (4.534)
ROA	−	−0.014 (−0.854)	−	−0.049*** (−4.016)
PUBLIC	+	−0.153 (−1.049)	+	0.464*** (5.303)
MULTIPLE LOCATIONS	+	0.527*** (3.671)	+	0.164** (1.861)
PEAK	−	−0.156* (−1.555)	+	−0.031 (−0.511)
Ln(HOURS)			+	0.805*** (23.968)
Adj. R^2		0.241		0.804
n =		336		336

*, **, and *** indicate that the estimated coefficients are significantly different from 0 at the 10 percent, 5 percent and 1 percent levels, respectively. Tests of directional expectations are one-tailed, while all other tests are two-tailed.

Variables are defined in Table 1.

planning, engagement teams do not consider the usual array of tests helpful in containing fraud risk (see also Houston et al. 1999).

The second column in Table 3 reveals the effects of error risk on planned strategies. When prospective clients have error risk factors, engagement teams more often plan to use high-risk specialists (24.0 vs. 8.0 percent; $p = 0.000$), industry experts (61.3 percent vs. 47.9 percent; $p = 0.040$), and more intensive testing (36.0 percent vs. 20.7 percent; $p = 0.006$). The greater use of industry experts and intensive testing for clients with error risk factors suggest that the firm considers knowledge of the client's business and traditional procedures effective in addressing error risks.

Additional Services

Table 2 shows that engagement teams plan more personnel hours in bids for clients purchasing additional services ($t = 3.153$, $p < 0.01$), supporting H3a. The percentage

TABLE 3
Effects of Fraud Risk, Error Risk, and Client Purchases of Additional Services on Engagement Planning Strategies

	At Least One Fraud Risk Factor		*At Least One Error Risk Factor*		*Client Purchases Additional Services*	
Engagement-Planning Strategy	*No (n = 269)*	*Yes (n = 67)*	*No (n = 261)*	*Yes (n = 75)*	*No (n = 280)*	*Yes (n = 56)*
Increased use of personnel specializing in high-risk clients	9.7%	19.4%	8.0%	24.0%	11.4%	12.5%
Chi-square =	4.96**		14.45***		0.05	
Increased use of industry experts	50.2	53.7	47.9	61.3	48.2	64.3
Chi-square =	0.27		4.21**		4.82**	
Additional layer of review	3.0	11.9	3.8	8.0	5.4	1.8
Chi-square =	9.51***		2.23		1.31	
More intensive testing	23.0	28.4	20.7	36.0	22.5	32.1
Chi-square =	0.83		7.46***		2.37	

*, **, and *** indicate that the estimated coefficients are different from 0 at the 10 percent, 5 percent, and 1 percent levels, respectively.

The table shows the percentages of clients having fraud risk or error risk factors, or purchasing additional services, for which the firm applies various risk-reducing strategies. Chi-square tests are used to test for differences in planned use of strategies.

difference implied by the coefficient of 0.372 is quite high (about 45 percent).[13] This result reinforces previously expressed concerns (e.g., Solomon 1990) that there may be systematic differences in clients purchasing additional services, including greater incidence of problems or organizational change among these clients. Our data provide evidence that helps distinguish among these explanations.

First, we find a similar incidence of risk factors among additional services and other clients (for fraud, 19.6 vs. 20.0 percent, $p = 0.951$; for error, 25.0 vs. 21.8 percent, $p = 0.598$). These findings work against the "client problems" explanation. Second, there are few differences in engagement strategies applied to additional services clients. Table 3 shows no difference in use of high-risk personnel, additional review, or testing intensity, any of which might imply "client problems." Thus, our evidence does not support a "client problems" explanation for increased effort and fees for additional services clients. However, engagement teams do more often plan to use industry experts for additional services clients (64.3 percent vs. 48.2 percent). Although greater use of industry specialists does not definitively confirm client organizational change as the reason for increased hours applied to those clients, these results form a pattern that is consistent with prior research (Hackenbrack and Knechel 1997).

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[13] The incremental hours associated with additional services clients in this study is similar in magnitude to Davis et al. (1993), who report mean personnel hours of 438 for nonpurchasers of additional services and 727 for purchasers, a 66 percent increase. For our data, the raw means are 408 for nonpurchasers and 662 for purchasers, a 52 percent increase.

Industry and Other Control Variables

Model (1) includes dichotomous variables for six broad industry categories. We find no significant differences in planned effort associated with industry membership. As expected, planned personnel hours increase with client size (ASSETS: $t = 6.830$, $p < 0.01$) and complexity (MULTIPLE LOCATIONS: $t = 3.671$, $p < 0.01$). Also as expected, PEAK season engagements have marginally fewer hours ($t = -1.555$, $p < 0.10$). None of the client business risk indicators (LEVERAGE, CASHFLOW, or ROA) significantly affects planned hours. In addition, teams do not plan more personnel hours for PUBLIC entities, consistent with results of Davis et al. (1993), but not with those of O'Keefe et al. (1994).

Model of the Proposed Engagement Fee

Fraud and Error Risk

Table 2 presents results of Model (2), which explains 80.4 percent of the variation in proposed fees ($F = 81.82$, $p < 0.0001$). The coefficient of 0.166 on FRAUD RISK implies that identification of a fraud risk factor is associated with an increase of about 19 percent in the proposed fee ($t = 2.358$, $p < 0.01$). The coefficient of 0.147 implies that ERROR RISK is associated with an increase of about 16 percent in the proposed fee ($t = 2.137$, $p < 0.05$). Thus, H1b and H2b are supported. Because Model (2) controls for planned hours, these findings imply that the firm charges a premium for both types of risk. This is the first direct archival evidence of a premium for fraud risk after SAS No. 82.

Additional Services

As reported in Table 2, Model (2) provides some evidence that bids for clients purchasing additional services are higher ($t = 1.552$, $p < 0.10$), supporting H3b. Based on the coefficient of 0.111 on ADDITIONAL SERVICES, the increase in proposed fee (after controlling for differences in planned personnel hours) is approximately 12 percent. Simunic (1984) notes that fee premia for additional services clients may reflect the firm's perception that knowledge sharing from joint supply of services provides higher quality on the engagement.

Industry and Other Control Variables

Two industry control variables have significant effects on proposed fees, after controlling for planned hours: HIGH TECH ($t = -3.264$, $p < 0.01$) and NATURAL RESOURCES ($t = -1.817$, $p < 0.10$). The discount offered to high-technology clients may indicate the firm's willingness to invest in a sector with high growth potential to build market share.

As expected, proposed fees are higher for larger clients ($t = 4.704$, $p < 0.01$), public clients ($t = 5.303$, $p < 0.01$), and clients with multiple locations ($t = 1.861$, $p < 0.05$). Clients with higher ROA receive a lower proposed fee ($t = -4.016$, $p < 0.01$), consistent with the view that return on assets is an indicator of client's business risk. In contrast, the coefficient on operating cash flows to total assets (CASHFLOW) is significantly positive ($t = 4.534$, $p < 0.01$). Although this result is inconsistent with pricing of CASHFLOW as a client business risk variable, Gul and Tsui (1998) report similar results.[14] They argue that the positive relation between cash flow and fees is consistent with free cash flow problems, including greater agency costs and increased ability to pay due to availability of discretionary resources. We also find that proposed fees do not depend on the timing of the engagement (PEAK), but are strongly influenced by planned personnel hours ($t = 23.968$, $p < 0.01$).

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[14] The opposite effects of ROA and CASHFLOW are interesting, given that these measures are positively correlated (Pearson correlation = 47.1 percent; $p < 0.01$). However, these conclusions continue to hold using orthogonal financial performance variables developed from a principal components analysis of the financial variables. Two components were identified. The first component was composed of CASHFLOW (positive weighting) and LEVERAGE (negative). The second component was predominately based on ROA. When substituted for the financial variables in the OLS fee model, the coefficient on the cash flow/leverage component indicated that proposed fees are lower for clients having lower cash flows. The coefficient of return on assets indicated that clients with low income are charged a premium.

The Client's Response to the Bid

The above evidence of fee premia for risk and additional services arises from a sample of submitted bids. While these results indicate that the firm seeks additional compensation for fraud risk, error risk, and additional services, it is unclear whether these premia survive market pressures. By comparing the effects of these variables on bids accepted vs. rejected by clients, we are able to evaluate the market's effect on premia sought by the firm. Table 4 presents results of Model (3), which includes interactions of the key risk and additional services variables with REJECTED, a dichotomous variable set to 0 for clients that accepted the firm's bid, and set to 1 for those that rejected the bid.[15] Table 4 shows that the main effects for both FRAUD RISK and ERROR RISK are significantly positive ($t = 1.957$, $p < 0.05$; and $t = 2.728$, $p < 0.01$, respectively), indicating that clients accepted bids that included risk premia. The interactions of both variables with REJECTED are not significant, indicating that clients that were charged higher fees on the basis of risk did not differentially reject the firm's bid. Thus, the firm is successful in charging risk premia.

In contrast, Model (3) shows that the coefficient on ADDITIONAL SERVICES is not significant ($t = -0.076$), so accepted bids for clients with additional services did not contain a fee premium. Moreover, the significantly positive interaction between ADDITIONAL SERVICES and REJECTED ($t = 3.082$, $p < 0.01$) implies that additional services clients who were charged a fee premium took their business elsewhere, and that price was the likely basis for the decision. The significantly positive coefficient on REJECTED ($t = 2.431$, $p < 0.05$) indicates that rejected bids are priced higher, after controlling for other fee determinants. Findings for control variables are similar to those reported in Table 2. Taken together, results shown in Table 4 suggest that the market limits the firm's ability to extract a fee premium for additional services clients, but permits a risk premium for riskier clients.

V. SUMMARY AND DISCUSSION

This study uses a contemporary sample (1997–1998) of bids a firm actually submitted to prospective clients to investigate how client risk factors and the provision of additional services affect engagement planning and bid pricing. We also examine pricing for bids accepted and rejected by clients, to gain insight into how market forces affect the firm's ability to extract fee premia for risk and additional services. Our study overcomes some limitations of prior archival studies by including explicit, *ex ante* fraud and error risk evaluations, as well as the engagement team's planned effort and proposed fees. The data also include the client's response to the bids, allowing insight into deal making, rather than the usual observation of only completed deals. Further, the sample period reflects the market environment of the late 1990s, following a period of upheaval in the audit industry, characterized by intense competition, declining profits from audit services, growth of consulting revenues, and litigation pressure.

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[15] Model (3) is restricted in that it considers only whether pricing of the key FRAUD RISK, ERROR RISK, and ADDITIONAL SERVICES variables differs among bids accepted and rejected by clients. An unrestricted model that interacts REJECTED with all control variables as well as with the key variables yields identical inferences on the key variables. The unrestricted model is subject to collinearity concerns, while the restricted model is not (all variance inflation factors in the reported model are less than 3.0).

TABLE 4
Regression of Proposed Fees for Bids Accepted and Rejected by Clients

$$(3)\ \ln(PROPOSED\ FEE) = \beta_0 + \beta_2\, REJECTED + \beta_2\, FRAUD\ RISK + \beta_3\, FRAUD\ RISK \times REJECTED + \beta_4\, ERROR\ RISK + \beta_5\, ERROR\ RISK \times REJECTED + \beta_6\, ADDITIONAL\ SERVICES + \beta_7\, ADDITIONAL\ SERVICES \times REJECTED + \beta_{8\text{–}13}\, (INDUSTRY\ VARIABLES) + \beta_{14} \ln(ASSETS) + \beta_{15}\, LEVERAGE + \beta_{16}\, CASHFLOW + \beta_{17}\, ROA + \beta_{18}\, PUBLIC + \beta_{19}\, MULTIPLE\ LOCATIONS + \beta_{20}\, PEAK + \beta_{21} \ln(HOURS) + u''$$

Variable	*Coefficient (t-statistic)*
Intercept	5.006*** (25.204)
REJECTED	0.199** (2.431)
FRAUD RISK	0.152** (1.957)
FRAUD RISK × REJECTED	0.205 (1.174)
ERROR RISK	0.195*** (2.728)
ERROR RISK × REJECTED	−0.285 (−1.518)
ADDITIONAL SERVICES	−0.005 (−0.067)
ADDITIONAL SERVICES × REJECTED	0.493*** (3.082)
Industry Control Variables	
HIGH TECH	−0.288*** (−3.360)
NATURAL RESOURCES	−0.262 (−1.642)
GOVERNMENT/NONPROFIT	0.108 (1.207)
MANUFACTURING	0.107 (1.109)
RETAIL	0.106 (1.007)
FINANCIAL SERVICES	0.105 (1.024)

(*Continued on next page*)

TABLE 4 (Continued)

Variable	*Coefficient (t-statistic)*
Other Control Variables	
ln(ASSETS)	0.055*** (4.486)
LEVERAGE	0.022 (0.527)
CASHFLOW	0.188*** (4.413)
ROA	−0.039*** (−3.964)
PUBLIC	0.352 (4.059)***
MULTIPLE LOCATIONS	0.174 (2.036)**
PEAK	−0.005 (−0.089)
ln(HOURS)	0.791 (24.033)***
Adj. R^2	0.819
n =	336

*, **, and *** indicate that the estimated coefficients are significantly different from 0 at the 10 percent, 5 percent and 1 percent levels, respectively. Tests of directional expectations are one-tailed, while all other tests are two-tailed.

The table shows coefficients (t-statistics) from estimating Model (3), which models proposed engagement fees for clients that accepted and rejected the firm's bid. Differences in pricing of the key variables (FRAUD RISK, ERROR RISK, and ADDITIONAL SERVICES) are tested through interactions of the these variables with REJECTED, a dichotomous variable that equals 0 for clients that accepted, and 1 for those that rejected, the firm's bid.

Other variables are defined in Table 1.

Despite these advantages, this study has several limitations. First, the data represent decisions made by a single firm. Although this feature may limit generalizability, using a single firm does hold constant the information considered in the firm's decisions and pricing strategies, and increases the power of empirical tests (O'Keefe et al. 1994). Second, only the data contained in the file are available for analysis. Although the data include many indicators of client and market characteristics and the firm's engagement plans, other potentially useful variables (e.g., fees charged for additional services) are not available. Third, the data come from a recent period, thereby hampering comparison with prior studies. For example, the low explanatory power of our hours model (compared with prior research) is puzzling. Emerging research using data from a contemporary sample period could help differentiate among several possible causes of this result. Fourth, we infer fee premia from a significant incremental fee associated with risk or additional services, after controlling for total planned personnel hours. While this approach is consistent with prior research (e.g., Davis et al. 1993), differences in labor mix across engagements make comparisons difficult.

While recognizing these limitations, we report a number of important results. Our findings on fraud and error risk are particularly important as evidence of decision making in the post-SAS No. 82 era. We find that identification of at least one fraud risk factor does not affect total planned personnel hours, but is associated with a risk premium. The finding that fraud risk does not affect planned effort likely reflects the difficulty of discovering fraud with standard procedures (AICPA 1997; Houston et al. 1999), but begs the question of what actions the firm takes to contain the identified risk. We find that the answer lies in the use of personnel who specialize in high-risk clients and in adding a layer of review, but not in increasing the extent or intensity of testing procedures, at least at the planning stage.

Regarding pricing, our results show that the presence of even *one* fraud or error risk factor is associated with a higher proposed fee and increased use of high-risk specialist personnel. Other results indicate that the firm responds differently to fraud and error risk. For example, engagement teams plan a marginal increase in total hours, greater use of industry experts, and more intensive testing for clients with an error risk factor, but not for clients with a fraud risk factor. These results imply that engagement teams consider traditional audit approaches more likely to reduce the risk of errors than the risk of fraud. We also find that market pressures do not eliminate risk premia charged for fraud and error risk, providing preliminary evidence of the profession's response to continued litigation.

Our other main findings focus on effects of additional services on effort planning and pricing for these initial attest engagements. We find the engagement team plans more effort and more use of industry experts for additional services clients. However, there is no evidence from the firm's risk analysis or its risk adaptation strategies that additional services clients are systematically riskier. These findings cast further doubt on the "client problems" explanation for incremental effort associated with additional services clients (Davis et al. 1993; Hackenbrack and Knechel 1997). Our collective evidence provides indirect support for the assertion that organizational changes taking place in clients purchasing additional services prompt firms to apply more effort to these clients.

After controlling for differences in planned hours, we find a small fee premium for additional services clients. While further evidence is needed, one explanation for these results is that the firm sees the possibility of increased quality through synergy across services, and sets bid prices accordingly. However, market pressures apparently eliminate the firm's ability to charge a fee premium for these engagements. These findings are topical given the SEC's concerns regarding the possible adverse consequences for audit quality when auditors provide additional services (Levitt 2000; Johnstone et al. 2001). While we cannot directly observe quality, we find that planned personnel hours are higher for additional services engagements, the firm plans to use more industry experts, and pricing is consistent with the attempt to charge a fee premium, not a discount. Thus, our results appear inconsistent with the SEC's concerns.

REFERENCES

Abdel-khalik, A. R. 1990. The jointness of audit fees and demand for MAS: A self-selection analysis. *Contemporary Accounting Research* 6 (2): 295–322.

American Institute of Certified Public Accountants (AICPA). 1983. *Audit Risk and Materiality in Conducting an Audit.* Statement on Auditing Standards No. 47. New York, NY: AICPA.

———. 1997. *Consideration of Fraud in a Financial Statement Audit.* Statement on Auditing Standards No. 82. New York, NY: AICPA.

Bedard, J. C. 1989. An archival survey of audit program planning. *Auditing: A Journal of Practice & Theory* 9 (Fall): 81–102.

Behn, B. K., J. V. Carcello, D. R. Hermanson, and R. H. Hermanson. 1999. Client satisfaction and Big 6 audit fees. *Contemporary Accounting Research* 16 (Winter): 587–608.

Bell, T. B., W. R. Landsman, and D. A. Shackelford. 2000. Auditors' perceived business risk and audit fees: Analysis and evidence. *Journal of Accounting Research* (forthcoming).

Belsley, D. A., E. Kuh, and R. E. Welsch. 1980. *Regression Diagnostics Identifying Influential Data and Sources of Collinearity.* New York, NY: John Wiley & Sons.

Breusch, T. S., and A. R. Pagan. 1979. A simple test for heteroscedasticity and random coefficient variation. *Econometrica* 47: 1287–1294.

Davidson, R. A., and W. E. Gist. 1996. Empirical evidence on the functional relation between audit planning and total audit effort. *Journal of Accounting Research* 34 (Spring): 111–124.

Davis, L. R., D. N. Ricchuite, and G. Trompeter. 1993. Audit effort, audit fees, and the provision of nonaudit services to audit clients. *The Accounting Review* 68 (January): 135–150.

Elitzur, R. R., and H. Falk. 1996. Auctions for audit services and low-balling. *Auditing: A Journal of Practice & Theory* 15 (Supplement): 41–59.

Fisher, F. M. 1970. Tests on equality between sets of coefficients in two linear regressions: An expository note. *Econometrica* 38 (March): 361–366.

Francis, J. 1984. The effect of audit firm size on audit prices: A study of the Australian market. *Journal of Accounting and Economics* (6): 133–151.

Francis, J. R., and D. T. Simon. 1987. A test of audit pricing in the small-client segment of the U.S. audit market. *The Accounting Review* 62 (January): 145–157.

Gujarati, D. N. 1988. *Basic Econometrics.* New York, NY: McGraw-Hill.

Gul, G., and J. Tsui. 1998. A test of the free cash flow and debt monitoring hypotheses: Evidence from audit pricing. *Journal of Accounting and Economics* (24): 219–237.

Hackenbrack, K., and W. R. Knechel. 1997. Resource allocation decisions in audit engagements. *Contemporary Accounting Research* 14 (Fall): 481–499.

Houston, R. W., M. F. Peters, and J. H. Pratt. 1999. The audit risk model, business risk, and audit-planning decisions. *The Accounting Review* 74 (July): 281–298.

Independence Standards Board (ISB). 2000. *A Conceptual Framework for Auditor Independence.* DM 00-1. New York, NY: ISB.

Johnstone, K. M. 2000. Client acceptance decisions: Simultaneous effects of client business risk, audit risk, auditor business risk, and risk adaptation. *Auditing: A Journal of Practice & Theory* 19 (Spring): 1–27.

———, M. H. Sutton, and T. D. Warfield. 2001. Antecedents and consequences of independence risk: Framework for analysis. *Accounting Horizons* 15 (March): 1–18.

Levitt, A. 1999. Quality information: The lifeblood of our markets. Remarks by Arthur Levitt at the Economic Club of New York, New York, NY, October 18.

———. 2000. Renewing the covenant with investors. Remarks at the New York University Center for Law and Business, New York, NY, May 10.

Libby, R., J. Artman, and J. Willingham. 1985. Process susceptibility, control risk, and audit planning. *The Accounting Review* 60 (April): 212–230.

Maletta, M., and T. Kida. 1993. The effect of risk factors on auditors' configural information processing. *The Accounting Review* 68 (January): 681–691.

Mock, T. J., and A. Wright. 1993. An exploratory study of auditors' evidential planning judgments. *Auditing: A Journal of Practice & Theory* 12 (Fall): 39–61.

———, and ———. 1999. Are audit program plans risk-adjusted? *Auditing: A Journal of Practice & Theory* 18 (Spring): 55–74.

O'Keefe, T. B., D. A. Simunic, and M. T. Stein. 1994. The production of audit services: Evidence from a major public accounting firm. *Journal of Accounting Research* 32 (Autumn): 241–261.

Palmrose, Z-V. 1986a. Audit fees and auditor size: Further evidence. *Journal of Accounting Research* 24 (Spring): 97–110.

———. 1986b. The effect of nonaudit services on the pricing of audit services: Further evidence. *Journal of Accounting Research* 24 (Autumn): 405–411.

———. 1989. The relation of audit contract type to audit fees and hours. *The Accounting Review* 64 (July): 488–499.

Pratt, J., and J. D. Stice. 1994. The effects of client characteristics on auditor litigation risk judgments, required audit evidence, and recommended audit fees. *The Accounting Review* 69 (October): 639–656.

Simon, D. T. 1985. The audit services market: Additional empirical evidence. *Auditing: A Journal of Practice & Theory* 5 (Fall): 71–78.

———, and J. R. Francis. 1988. The effects of auditor change on audit fees: Tests of price cutting and price recovery. *The Accounting Review* 63 (April): 255–269.

Simunic, D. A. 1980. The pricing of audit services: Theory and evidence. *Journal of Accounting Research* 18 (Spring): 161–190.

———. 1984. Auditing, consulting, and auditor independence. *Journal of Accounting Research* 22 (Autumn): 679–702.

———, and M. T. Stein. 1990. Audit risk in a client portfolio context. *Contemporary Accounting Research* 6 (Spring): 329–340.

———, and ———. 1996. The impact of litigation risk on audit pricing: A review of the economics and the evidence. *Auditing: A Journal of Practice & Theory* 15 (Supplement): 119–134.

Solomon, I. 1990. Discussion of: The jointness of audit fees and demand for MAS: A self-selection analysis. *Contemporary Accounting Research* 6 (2): 323–328.

Stein, M. T., D. A. Simunic, and T. B. O'Keefe. 1994. Industry differences in the production of audit services. *Auditing: A Journal of Practice & Theory* 13 (Supplement): 128–142.

Stice, J. D. 1991. Using financial and market information to identify pre-engagement factors associated with lawsuits against auditors. *The Accounting Review* 66 (July): 516–533.

Turpen, R. A. 1990. Differential pricing on auditors' initial engagements: Further evidence. *Auditing: A Journal of Practice & Theory* 9 (Spring): 60–76.

Yardley, J., L. Kauffman, T. Cairney, and D. Albrecht. 1992. Supplier behavior in the U.S. audit market. *Journal of Accounting Literature* 11: 151–184.

Zimbelman, M. F. 1997. The effects of SAS No. 82 on auditors' attention to fraud risk factors and audit planning decisions. *Journal of Accounting Research* 35 (Supplement): 75–97.

THE ACCOUNTING REVIEW
Vol. 76, No. 2
April 2001
pp. 221–244

Investors' Trade Size and Trading Responses around Earnings Announcements: An Empirical Investigation

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ABSTRACT: Prior research suggests that the earnings expectations of a segment of the market can be described by the seasonal random-walk model. Prior research also provides evidence that less wealthy and less informed investors tend to make smaller trades (small traders) than wealthier and better-informed investors (large traders). I hypothesize that it is the earnings expectations of small traders that are associated with predictions from the seasonal random-walk model. By directly analyzing the trading activities of small and large traders, this study provides evidence that is largely consistent with the hypotheses. Specifically, small traders' trading response around earnings announcements is increasing in the magnitude of seasonal random-walk forecast errors, even after controlling for absolute analyst forecast errors, contemporaneous price changes, and market-wide trading. Supplementary analysis reveals that this effect is largely confined to firms with relatively impoverished information environments (i.e., smaller firms and firms with little to moderate analyst following).

Keywords: *earnings announcements; information asymmetry; market microstructure; trading volume.*

This paper is based on my dissertation at the University of Georgia. I would like to thank the members of my dissertation committee: Linda Bamber (Chair), Russell Barefield, Shane Corwin, Jennifer Gaver, Kenneth Gaver, and Marc Lipson for their valuable guidance. Workshop participants at the University of Alberta, London Business School, University of Minnesota, Pennsylvania State University, Texas Christian University, University of Utah, and University of Washington, an anonymous reviewer, Christine Botosan and Marlene Plumlee provided many valuable suggestions. Part of this research has been conducted using the facilities of The Center for Scientific Computing at the University of Utah. Special thanks go to Michael Miller of University Computing and Networking Services at the University of Georgia, and to Nelson Beebe of The Center for Scientific Computing at the University of Utah. Finally, I gratefully acknowledge the contribution of I/B/E/S International Inc. for providing earnings-per-share forecast data, available through the Institutional Brokers' Estimate System. These data have been provided as part of a broad academic program to encourage earnings expectation research.

Editor's Note: This paper is a winner of the 2000 AAA Competitive Manuscript Award.

Submitted March 2000
Accepted November 2000

Data Availability: *The data used in this study are publicly available from the sources indicated in the text. A list of sample firms is available from the author.*

I. INTRODUCTION

Recent research suggests that a segment of the market fails to promptly assimilate certain publicly available, value-relevant information when forming earnings expectations (Rendleman et al. 1987; Freeman and Tse 1989; Bernard and Thomas 1989, 1990; Ball and Bartov 1996; Bernard et al. 1997; Walther 1997). Bernard and Thomas (1990) further conclude that a segment of the market appears to rely on the seasonal random-walk model to form earnings expectations. This puzzling evidence raises a question about the characteristics of those investors (notably their wealth and the sophistication of their information acquisition and processing) who would limit themselves to an incomplete information set, anchoring on a naïve expectation model such as the seasonal random-walk.

Theoretical works by Ohlson (1975) and Wilson (1975) indicate that the benefits investors derive from information increase with investor wealth. In an extension of Ohlson's (1975) model, Cready (1988) shows that investors' use of costly predisclosure information increases with their wealth. This suggests that less wealthy investors, on average, use less costly information sources than do wealthier investors. Therefore, the segment of the market that relies on the readily available seasonal random-walk model (one of the least costly expectation models) is likely to be disproportionately populated by less wealthy investors.

Prior research suggests that transaction size increases along with investors' wealth (Cready 1988; Lee 1992; Lee and Radhakrishna 2000) and informedness (Easley and O'Hara 1987; Hasbrouck 1988, 1991). On average, wealthier and more informed investors are likely to make larger trades (henceforth, "large traders"), whereas less wealthy and less informed investors are likely to make smaller trades (henceforth, "small traders"). Consequently, this study hypothesizes that it is the small traders' earnings expectations that are most likely to be significantly associated with predictions from the seasonal random-walk model. In contrast, large traders likely incorporate into their earnings expectations costly, value-relevant, and more current predisclosure information than simply the previous year's earnings (i.e., more than just the seasonal random-walk forecasts). Thus, seasonal random-walk forecast errors are unlikely to play an incremental role in explaining the trading activities of large traders after controlling for the new information (surprise) in earnings announcements.

The study's results, based on quarterly earnings announcements from 1988 to 1992, are largely consistent with the hypotheses. The small traders' abnormal trading response is significantly positively associated with absolute seasonal random-walk forecast errors, even after controlling for absolute analyst forecast errors, contemporaneous price changes, and market-wide trading, whereas large traders' abnormal trading response is not. Supplementary analysis after partitioning the sample by firm size and analyst following reveals that the association between small traders' abnormal trading response and absolute seasonal random-walk forecast errors is strongest for small firms and firms with low-to-moderate analyst following. As firm size increases, the association gradually weakens, such that for the largest firms, the small traders' abnormal trading response is unrelated to random-walk forecast errors. Similarly, I find a positive association between small traders' trading and seasonal random-walk forecast errors for firms with low-to-moderate analyst following, but not for firms with the heaviest analyst following. These results suggest that small traders tend to rely more heavily on the seasonal random-walk model when forming earnings expectations for smaller firms or firms with relatively low analyst following.

The study's evidence may be of interest to policymakers. Bloomfield et al.'s (1998) laboratory market study suggests that less informed investors tend to be overconfident, trading too aggressively given their limited information set.[1] Bloomfield et al. (1998) also find that less informed investors systematically transfer wealth to more informed investors as a result of overly aggressive trading. Therefore, direct evidence from archival data that small traders (especially investors in smaller or lightly followed firms) are relatively more likely to anchor on an incomplete information set is relevant to policymakers charged with protecting the interests of investors with limited abilities and resources.[2]

This study's empirical evidence also reveals that earnings announcements can generate differential trading responses among different classes of investors. For example, after controlling for new information revealed by the earnings announcements, I find that announcements with relatively large random-walk-based forecast errors are likely to generate heavier trading among small traders than among large traders. Because the trading activities of small traders may not stimulate large price or volume reactions, concluding that a disclosure is of little use to individual investors based simply on negligible average price and volume reactions would be premature. Such disclosures may be informative to small traders (even if they do not provide much new information to large traders), thereby leveling the informational playing field. Thus, policymakers evaluating the usefulness of disclosures (especially to investors with limited abilities and resources) may want to consider not only average price and volume reactions, but also trading responses in different investor segments.

Finally, the study's empirical results shed some light into the post-earnings announcement drift. Bernard and Thomas (1990) attribute the drift primarily to a segment of the market that fails to assimilate certain value-relevant information, anchoring on a naïve seasonal random-walk model to form earnings expectations. This evidence begs the question as to which investors are likely to limit themselves to an incomplete information set such as the seasonal random-walk. By analyzing the trading activities of small and large traders, this study provides direct evidence that the segment of the market that appears to rely on the seasonal random-walk earnings expectation model in making trading decisions consists mainly of small traders, who are likely to be less wealthy and less informed.

The rest of the paper is organized as follows. Section II develops the study's hypotheses in the context of prior research. Section III discusses the data and the sample selection criteria. Section IV describes the research design. A discussion of the empirical results appears in Section V. Finally, Section VI provides a short conclusion.

II. CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Prior research suggests that at least some market participants fail to fully assimilate publicly available, value-relevant information from previously announced earnings in forming expectations about future earnings (Rendleman et al. 1987; Freeman and Tse 1989; Bernard and Thomas 1989, 1990; Bartov 1992; Bernard and Seyhun 1997; Bernard, Thomas and Wahlen 1997). More specifically, Bernard and Thomas (1990) argue that a segment of

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[1] The psychology literature also reports that less informed individuals tend to be overconfident in their knowledge and information, relative to more informed individuals (e.g., Peterson and Pitz 1988; Griffin and Tversky 1992).

[2] For example, the AICPA study group (AICPA, 1973, 17) on the *Objectives of Financial Statements* notes, "An objective of financial statements is to serve primarily those users who have limited authority, ability or resources to obtain information." One of the SEC's primary missions is to mandate disclosures that reduce the extent to which some investors are at an informational disadvantage relative to others (Foster 1986, 40; Hand and Beatty 1992).

the market fails to recognize the extent to which the time-series behavior of earnings deviates from a seasonal random-walk, in which expected earnings are simply earnings for the corresponding quarter from the previous year. In particular, they report that abnormal returns around quarterly earnings announcements have the same autocorrelation structure as forecast errors from a seasonal random-walk earnings expectation model. They conclude that their results are consistent with the notion that a segment of the market relies on the seasonal random-walk model to form expectations about future earnings. More recently, Ball and Bartov (1996) argue that the market correctly identifies the Brown-Rozeff historical earnings series, but underestimates the parameters.[3] However, since forecast errors from an underweighted Brown-Rozeff model correlate highly with forecast errors from the seasonal random-walk model, earnings announcements with large random-walk-based forecast errors are likely to spur trading by investors who anchor on *either* model. Finally, relying on a firm-level analysis of price reactions to the earnings announcements of both small and large firms, Walther (1997) reports that price reactions to small firms' announcements reflect seasonal random-walk earnings expectations.[4] This body of evidence suggests that the seasonal random-walk model proxies for the earnings expectations of some segment of the market.

This evidence raises the question as to which investors would limit themselves to the incomplete information set reflected in the seasonal random-walk model. Ohlson's (1975) theoretical model shows that the value of an information system increases with investor wealth. In his model, the term "value" pertains only to the benefit side of information and does not incorporate the cost of information. Cready (1988) introduces information cost into Ohlson's (1975) model and shows that when the value of costly information increases with wealth, investors' acquisition of costly information also increases with wealth.[5] This suggests that less wealthy investors use less costly information sources than do wealthier investors, on average. The segment of the market that anchors on the seasonal random-walk model to form earnings expectations is therefore likely to consist primarily of less wealthy investors, because a seasonal random-walk is one of the least costly expectation models.[6] Conversely, wealthier investors tend to incorporate costly, value-relevant predisclosure information beyond the past earnings series into their earnings expectations (El-Gazzar 1998). Therefore, the trading response of large traders is unlikely to be associated with forecasts from the seasonal random-walk model.

Prior research indicates that transaction size increases in proportion to investor wealth (Cready 1988; Lee 1992; Chan and Lakonishok 1993; Lee and Radhakrishna 2000). In addition, Easley and O'Hara's (1987) theoretical model predicts that more informed traders make larger trades than do less informed traders. Hasbrouck (1988, 1991) also provides empirical evidence that large trades are generally more informative than small trades. This body of evidence indicates that wealthier, better informed investors are likely to make larger trades than are less wealthy, less informed investors.

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[3] Brown and Rozeff (1979) conclude that the time-series of quarterly earnings is best modeled with a seasonally differenced first-order autogressive component to account for positive but declining autocorrelation in lags one through three, and a seasonally differenced first-order moving average component to account for the negative correlation between lag one and lag four.

[4] Specifically, Walther (1997) finds that seasonal random-walk forecast errors explain more of the variation in excess returns for firms with low institutional ownership and low analyst following, while analyst forecast errors explain more of the variation in excess returns for firms with higher institutional ownership and higher analyst following.

[5] Similarly, Lev (1988) argues that the acquisition of certain information may be economically justifiable at relatively high levels of investment, but may not be economically optimal for smaller investments.

[6] Some might argue that analyst forecasts such as those provided by Value Line are readily accessible and not substantially more costly than random-walk forecasts. However, Value Line does not cover all firms (especially smaller firms). Therefore, the cost of acquiring analyst forecasts for a small firm not covered by Value Line can be markedly higher than the cost of obtaining random-walk forecasts.

These conclusions suggest that it is the small traders whose earnings expectations will most likely reflect seasonal random-walk forecasts. Hence, the first testable hypothesis:

H1: Earnings announcements with larger seasonal random-walk forecast errors generate more intense trading among small traders than do earnings announcements with smaller seasonal random-walk forecast errors, *ceteris paribus.*

In contrast, large traders are more likely to acquire costly, value-relevant predisclosure information, and are less likely to anchor on the seasonal random-walk model to form earnings expectations. Hence, the second testable hypothesis:

H2: Large traders' trading is unrelated to the magnitude of seasonal random-walk forecast errors, *ceteris paribus.*

The *ceteris paribus* condition in H1 and H2 requires a control for the "surprise" or "new information" (relative to current, updated expectations) revealed by the earnings announcements. In other words, the hypotheses predict that after controlling for the extent to which earnings announcements convey new information to the market, small traders' trading responses are still significantly positively associated with seasonal random-walk forecast errors, whereas large traders' trading responses are not.

Security analysts have incentives to quickly impound value-relevant predisclosure information in their earnings forecasts. For example, Mikhail et al. (1999) find that an analyst is more likely to depart the brokerage firm if his earnings forecasts are less accurate than those of his peers. Brown et al. (1987) also conclude that security analysts incorporate into their earnings forecasts a broader and more current information set than do univariate time-series models. Therefore, I use absolute analyst forecast errors to control for new information conveyed to the market by the earnings announcements.

I also control for contemporaneous firm-specific returns, in the event that absolute analyst forecast errors do not fully capture the surprise in earnings (e.g., Kross et al. 1994; Bamber et al. 1999). Because trading volume is significantly positively correlated with absolute price change (see Karpoff [1987] for a review), controlling for contemporaneous firm-specific returns has the additional advantage of controlling for the possibility that some traders may simply trade more on days with larger price changes. Prior research has also shown that volume is higher, on average, when prices are increasing than when prices are falling (Karpoff 1987). Thus, I include two firm-specific return variables—one for positive daily returns and one for negative daily returns—to allow for differential trading associated with upticks vs. downticks.[7]

Finally, I control for the percentage of shares traded for all NYSE/AMEX firms to abstract from liquidity trading associated with macroeconomic factors (e.g., Bamber et al. 1997). To control for liquidity trading associated with firm-specific factors, I also adjust for the firm-specific average level of trading (e.g., Bamber et al. 1997; Kross et al. 1994).

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[7] The analyses reported here are based on firm-specific raw returns. Karpoff (1987) suggests that the asymmetric volume response (i.e., generally higher volume for upticks than for downticks) is associated with the direction of the price change rather than the sign of abnormal returns. However, the study's inferences are unchanged when I repeat the analyses using market-adjusted returns.

III. DATA AND SAMPLE SELECTION

I obtained the trade data for this study from the database distributed by the Institute for the Study of Security Markets (ISSM). These data include information on all firms whose primary listing is the NYSE, the AMEX, or the NASDAQ. The ISSM reports all trades and quotes originating from NYSE, AMEX, NASDAQ, or the regional exchanges. For each trade, it records the time of the transaction to the nearest second, price, volume, the code for the originating exchange, and a condition code.[8]

The study includes trades with a condition code of "regular sale" between 9:30 AM and 4:15 PM Eastern Standard Time. The only exception is the exclusion of each day's opening trade, because these trades are often batched (the sum of multiple orders), and therefore their inclusion could add noise (Lee and Ready 1991; Lee 1992).[9] Following Lee (1992), I include trades time-stamped up to 15 minutes after the closing of the NYSE and the AMEX to pick up trades originating on the Pacific Exchange (which operates until 4:30 PM EST) or trades reported late.[10]

Because I use Institutional Brokers Estimate System (I/B/E/S) earnings forecast data, in order to minimize noise in the forecast error metrics, I use I/B/E/S actual earnings to calculate random-walk and analyst forecast errors (e.g., Philbrick and Ricks 1991).

This study includes quarterly earnings announcements from 1988 to 1992 for firms with primary listings on either the NYSE or the AMEX. The sample observations meet five selection criteria:

1. Quarterly EPS data are available for the firm. This criterion excludes firms in certain industries that do not report earnings—real estate investment trusts, closed-end mutual funds, credit unions, and so on.
2. The I/B/E/S detail data offer one or more analysts' forecasts of the firm's quarterly earnings, published within six weeks prior to the quarterly earnings announcement date. This criterion ensures that the analysts' forecasts are current.
3. The absolute value of actual quarterly EPS exceeds $0.20, to avoid extreme forecast error metrics arising from very small denominators.[11]
4. The sample includes observations whose year-end stock prices are between $1 and $500 inclusive, to ensure that small and large trades fall within certain cutoffs (as explained in detail in Section IV).
5. Following Lee (1992), the sample includes firms with an annual average of at least ten trades per day, to avoid problems in drawing inferences about information-induced trading in thinly traded issues.

These criteria yield a sample of 16,444 quarterly earnings announcements.

IV. RESEARCH DESIGN

Small and Large Traders

Because prior research indicates that wealthier, better informed investors are likely to make larger trades than are less wealthy, less informed investors (Easley and O'Hara 1987;

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[8] The Appendix reviews relevant market microstructure details and briefly discusses ISSM's condition codes.

[9] Unlike most other trades, opening trades do not involve a continuous two-sided auction. The opening trade of each day is a single-call auction; so are certain block trades, which are prearranged away from the exchange floor. Since I include only those trades with condition codes of "regular sale," these block trades are automatically excluded.

[10] Lee and Ready (1991) provide empirical evidence that trades are often reported with a short lag.

[11] O'Brien (1988) and Bamber and Cheon (1995) use similar cutoff rules. In addition, the study's inferences are identical using alternative absolute EPS cutoffs of $0.15 and $0.25.

Cready 1988; Hasbrouck 1991; Chan and Lakonishok 1993), this study uses trade size to distinguish between these two classes of investors. However, Kyle's (1985) model shows that informed investors often have an incentive to engage in moderate-sized trades to disguise their private information. Empirical research also indicates that informed investors often concentrate in medium-sized trades (e.g., Cornell and Sirri 1992; Meulbroek 1992; Barclay and Warner 1993). Informed investors are unlikely, however, to engage in very small trades because this significantly increases their transaction costs. In addition, a flurry of small orders from one account would likely prompt the specialist to increase the spread. Consequently, I eliminate medium-sized trades and focus instead on large and small trades to distinguish more clearly the trading activities of wealthier, better informed traders from those of less wealthy, less informed traders. Lee and Radhakrishna (2000) also report that eliminating a "buffer-zone" of medium-sized trades increases the power of the statistical tests to separate the trading activities of these two classes of investors.

Prior research has used two alternative proxies to distinguish between small and large traders: (1) the number of shares traded (hereafter, "trade-size-based proxy"; Cready 1988; Cready and Mynatt 1991), and (2) the dollar value of the transaction (hereafter, "dollar-value-based proxy"; Lee 1992; Lee and Radhakrishna 2000). The limitation of the trade-size-based proxy is that it does not reflect differences in stock prices. Lee and Radhakrishna (2000) find that dollar-value-based proxies are generally less noisy than are trade-size-based proxies in separating small and large investor transactions. Therefore, I adopt a dollar-value-based proxy to distinguish between small and large traders.[12]

Dollar-value-based proxies are, however, sensitive to stock price changes. For example, if a stock is trading at $10, then a $5,000 cutoff for small trades would classify (round-lot) trades of 100 to 500 shares as small trades. If the stock moves to 10 1/8, only 100 to 400 shares will be classified as small trades. Following Lee (1992) and Lee and Radhakrishna (2000), I mitigate this problem by using the following firm-specific dollar-value-based proxy:

1. Obtain the firm's closing price as of December 30. Compare the closing price to $5,000, and determine the largest number of round-lot shares that is less than or equal to $5,000. Trades of this number of shares or fewer are classified as small trades.
2. Determine the cutoff for large trades by comparing the closing price to $50,000 and determine the smallest number of round-lot shares that is greater than or equal to $50,000. Trades of this number of shares or more are classified as large trades.

Finally, I eliminate stocks with unusually low or unusually high year-end share prices to ensure that small and large trades do not exceed certain specified boundaries. I omit observations with year-end share prices of less than $1 to ensure that the small trade cutoff does not exceed 5,000 shares, even for the lowest priced stocks. Similarly, I omit stocks with year-end share prices of $500 or more to ensure that the cost of the smallest round-lot trade is less than $50,000.

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[12] I also repeated the analyses using the following trade-size-based proxy: (1) transactions of 200 shares or less proxy for trades initiated by small traders, (2) transactions of 2,500 shares or more proxy for trades initiated by large traders. The overall tenor of the result does not change, so I report results based only on the dollar-value-based proxy.

Observation Intervals

The statistical analyses reported in this study cover five different observation intervals:

1. Day 0, the earnings announcement day;
2. Day +1, the day after the earnings announcement;
3. Day +2, the second day after the earnings announcement;
4. Days 0 and +1; and
5. Days 0, +1, and +2.

Lee (1992) shows that almost 95 percent of abnormal trading responses for both small and large trades occur within three full days after the announcements, so the observation intervals in this study are likely to capture most of the abnormal trading.[13] I analyzed windows up to Day +2 because prior studies showed that, while large investors' abnormal trading responses cluster immediately around the earnings announcements, small investors' trades are dispersed across the next two trading days (Cready 1988; Lee 1992).

Measures of Abnormal Trading

I use two different trading metrics to measure trading responses: (1) the total number of *trades* in investor group j during the observation interval of length t for sample firm i, and (2) the total number of *shares traded* (trading volume) in investor group j during the observation interval of length t for sample firm i.[14] The abnormal trading response based on total number of trades ($A\_NUMBER\_TRADES_{ijt}$) is calculated by subtracting the firm-specific average number of trades made by investor group j from the announcement-period trades made by investor group j, and then scaling this difference by the total number of trades for that firm made by investor group j during the entire year:

$$A\_NUMBER\_TRADES_{ijt} = \frac{\begin{array}{l}\text{Number of firm i trades by}\\ \text{investor group j during earnings}\\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average number of firm i trades}\\ \text{by investor group j during}\\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i trades by investor group j during the year}} \times 100,$$

where j indicates the investor group and $j = 0$ signifies small traders, while $j = 1$ signifies large traders.

Similarly, I calculated the abnormal trading response based on total number of *shares traded* or *trading volume* ($A\_SHARES\_TRADED_{ijt}$) by subtracting the firm-specific average trading volume generated by investor group j from the announcement-period trading volume generated by investor group j, and then scaling this difference by the total number of the firm's shares traded by the same investor group during the entire year:

$$A\_SHARES\_TRADED_{ijt} = \frac{\begin{array}{l}\text{Trading volume for firm i in}\\ \text{investor group j during earnings}\\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average trading volume for}\\ \text{firm i in investor group j during}\\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i shares traded by investor group j during the year}} \times 100.$$

The average firm-specific number of trades or trading volume are calculated for intervals of length t over the fiscal year. For example, the average number of firm i trades

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[13] I extended the analysis up to Day +4, but found no abnormal trading in either the small or the large traders' categories on Days +3 and +4.

[14] I also repeated the analyses using a third metric, based on the total dollar value of shares traded. Since the results were similar across all three measures of abnormal trading, I report results based only on the first two measures.

(trading volume) by investor group j during the observation interval spanning just one day is simply the daily average of firm i trades (trading volume) made by investor group j over the fiscal year.

Variable Definitions

For each earnings announcement, I calculate the small traders' abnormal trading response (hereafter, SMALLAT) for each of the five observation intervals using the two abnormal trading response metrics ($A\_NUMBER\_TRADES_{ijt}$ and $A\_SHARES\_TRADED_{ijt}$). Likewise, I calculate the large traders' abnormal trading response (hereafter, LARGEAT). The seasonal random-walk forecast error (hereafter, FERW) equals the absolute value of the difference between the actual quarterly EPS and the EPS for the corresponding quarter of the previous year, deflated by the absolute value of the actual quarterly EPS.

The control variables are defined as follows. Absolute analyst forecast error (hereafter, FEA) is defined as the absolute value of the difference between actual quarterly EPS and the most recent analyst forecast, deflated by the absolute value of the actual quarterly EPS. I use the most recent analyst forecast because O'Brien (1988) shows the most current forecast is generally more accurate than either the mean or the median of all available forecasts. O'Brien (1988) also reports that aggregating relatively recent forecasts may further increase forecast accuracy by averaging out idiosyncratic individual errors. Accordingly, I also calculate FEA using the mean and the median of all forecasts issued within six weeks prior to the earnings announcement date. Since the results are robust across all three measures of FEA, I report results based on the most recent forecast only. To control for contemporaneous firm-specific returns (RETURN), I include absolute values of positive and negative returns, separately, to allow for asymmetric trading associated with upticks vs. downticks. Finally, I calculate the percentages of all NYSE/AMEX firms' outstanding shares traded over each of the five observation intervals (hereafter, MKTVOL), to control for market-wide trading.

V. RESULTS

Descriptive Statistics

Table 1 provides descriptive statistics on abnormal trading and forecast error variables as well as on contemporaneous firm-specific returns. All values are expressed as percentages. Panel A reports the mean and the median of the small traders' abnormal trades or trading volume (SMALLAT) during each day in the announcement period. For example, SMALLAT based on total number of trades (A_NUMBER_TRADES) is calculated as follows. The numerator is the actual number of trades small traders make in the firm's shares during the earnings announcement interval minus the average number of trades small traders make in the firm's shares during the observation interval of same length. This number of abnormal trades is then expressed as a percentage of the total number of trades the small traders make in the firm's shares over the entire year. Assuming 253 trading days in a year, the average proportion of small traders' annual trades that occur on any given day is 0.3953 (i.e., 1/253 times 100). Thus, Panel A of Table 1 shows that the mean of small traders' trading responses (based on number of trades) on the earnings announcement day (Day 0) is approximately 7.5 percent more than their trading responses on an average day (0.0297/0.3953). SMALLAT based on trading volume (A_SHARES_TRADED) is computed similarly, but using the number of shares traded rather than the number of trades. Panel B of Table 1 reports descriptive statistics on the large traders' abnormal trading response (LARGEAT). Panels A and B show that abnormal trading is positively skewed, consistent with prior research (e.g., Morse 1981; Bamber 1987; Bamber et al. 1997).

TABLE 1
Descriptive Statistics on Abnormal Trading, Forecast Error, and Return Variables[a]

Panel A: Small Traders' Abnormal Trading (SMALLAT)[b]

Observation[c] Intervals	*SMALLAT Based on $A\_NUMBER\_TRADES_{ijt}$*		*SMALLAT Based on $A\_SHARES\_TRADED_{ijt}$*	
	Mean	*Median*	*Mean*	*Median*
Day 0	0.0297	0.0027	0.0307	0.0037
Day +1	0.0029	−0.0109	0.0045	−0.0123
Day +2	−0.0299	−0.0331	−0.0309	−0.0349

Panel B: Large Traders' Abnormal Trading (LARGEAT)

Observation Intervals	*LARGEAT Based on $A\_NUMBER\_TRADES_{ijt}$*		*LARGEAT Based on $A\_SHARES\_TRADED_{ijt}$*	
	Mean	*Median*	*Mean*	*Median*
Day 0	0.1467	0.0039	0.1608	0.0057
Day +1	0.0273	−0.0320	0.0324	−0.0934
Day +2	−0.0221	−0.0556	−0.0169	−0.1140

Panel C: Random-Walk Forecast Errors (FERW), Analyst Forecast Errors (FEA), and Firm-Specific Returns[d]

FERW		*FEA*		*RETURN*	
Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
53.87	21.86	33.51	11.11	0.06	0.00

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[a] Table values are percentages.

[b] I measured trading response using two different trading response metrics: (1) the total number of trades in investor group j during observation interval of length t for sample firm i ($A\_NUMBER\_TRADES_{ijt}$), and (2) the total number of shares traded (trading volume) in investor group j during observation interval of length t for sample firm i ($A\_SHARES\_TRADED_{ijt}$). The abnormal trading response metric using number of trades is defined as:

$$A\_NUMBER\_TRADES_{ijt} = \frac{\begin{array}{l}\text{Number of firm i trades by} \\ \text{investor group j during earnings} \\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average number of firm i trades} \\ \text{by investor group j during} \\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i trades by investor group j during the year}} \times 100,$$

where j = 0 indicates small traders, while j = 1 indicates large traders. Similarly, the abnormal trading response metric using the total number of shares traded (trading volume) is defined as:

$$A\_SHARES\_TRADED_{ijt} = \frac{\begin{array}{l}\text{Trading volume for firm i in} \\ \text{investor group j during earnings} \\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average trading volume for} \\ \text{firm i in investor group j during} \\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i shares traded by investor group j during the year}} \times 100.$$

(*Continued on next page*)

TABLE 1 (Continued)

The trades are assigned to small and large traders' groups as follows: (1) Obtain the firm's closing price as of December 30. (2) Compare the closing price to \$5,000, and determine the largest number of round-lot shares that is less than or equal to \$5,000. Trades of this number of shares or less are classified as small trades. (3) Similarly, determine the cutoff for large trades by comparing the closing price to \$50,000, and determine the smallest number of round-lot shares that is greater than or equal to \$50,000. Trades of this number of shares or more are classified as large trades.

[c] Day 0 is the earnings announcement day.

[d] FERW is the absolute value of the difference between the actual quarterly EPS and the EPS for the corresponding quarter of the previous year, deflated by the actual quarterly EPS and expressed as a percentage. FEA is the absolute value of the difference between the actual quarterly EPS and the most recent analyst forecast, deflated by the actual quarterly EPS and expressed as a percentage. Finally, the table reports the mean and the median of firm-specific, contemporaneous, raw returns on the earning announcement day (Day 0), also expressed as a percentage.

The two abnormal trading response metrics (A_NUMBER_TRADES and A_SHARES_TRADED) are highly correlated. For small traders, untabulated correlations between the two abnormal trading metrics are approximately 99 percent for all three days (Days 0, +1, +2). For large traders, the correlations between the two metrics range from 89 to 94 percent.

Panel C reports the forecast error variables and contemporaneous firm-specific returns on the earnings announcement day (Day 0). The median absolute analyst forecast error (FEA) is approximately 11 percent of the actual quarterly EPS. This is much lower than the median absolute seasonal random-walk forecast error (FERW), which is approximately 22 percent, as expected if analysts assimilate predisclosure information beyond EPS for the same quarter of the previous year. The absolute random-walk and analyst forecast errors are also positively skewed. Finally, the mean and the median of firm-specific earnings announcement day returns are 0.06 percent and 0.0 percent, respectively, suggesting that the sample firms' earnings announcement day price responses are fairly symmetric.

Descriptive Univariate Correlations

Hypotheses 1 and 2 suggest that small traders are likely to anchor on the seasonal random-walk earnings expectation model, whereas large traders are not. Therefore, I expect FERW to be more positively associated with small traders' trading response than with large traders' trading response:

$$\rho\ (\text{SMALLAT, FERW}) > \rho\ (\text{LARGEAT, FERW}).$$

Since trading response metrics and earnings forecast errors are positively skewed, I calculate Spearman rank correlations. To assess whether FERW is more positively associated with SMALLAT than with LARGEAT, I use Vuong's (1989) likelihood ratio test. Vuong's (1989) Z-statistic can be used to compare the power of FERW for explaining variations in SMALLAT vis-à-vis LARGEAT. A significantly positive Z indicates that FERW is more positively associated with SMALLAT than with LARGEAT.

Table 2 reports correlations between SMALLAT and FERW, correlations between LARGEAT and FERW, and Vuong's Z-statistic. Panel A reports results where abnormal trading responses are based on *number of trades* (A_NUMBER_TRADES), while Panel B reports results based on *trading volume* (A_SHARES_TRADED). The first column of Table 2

TABLE 2
Spearman Correlations between Small and Large Traders' Abnormal Trading Responses and Random-Walk Forecast Errors[a]

Panel A: SMALLAT, LARGEAT Based on Number of Traders (A_NUMBER_TRADES$_{ijt}$)[b]

Observation Intervals[c]	ρ *(SMALLAT, FERW*[d]*)*	ρ *(LARGEAT, FERW)*	*Vuong's Z-statistic*
Day 0	0.0232	−0.0117	0.0150
	(0.0028)	(0.1332)	(0.0004)
Day +1	0.0330	−0.0293	0.0265
	(0.0001)	(0.0002)	(0.0001)
Day +2	0.0090	−0.0244	0.0140
	(0.2494)	(0.0017)	(0.0009)
Days 0 to +1	0.0347	−0.0066	0.0180
	(0.0001)	(0.3997)	(0.0001)
Days 0 to +2	0.0292	−0.0017	0.0134
	(0.0002)	(0.8299)	(0.0006)

Panel B: SMALLAT, LARGEAT Based on Trading Volume (A_SHARES_TRADED$_{ijt}$)

Observation Intervals	ρ *(SMALLAT, FERW)*	ρ *(LARGEAT, FERW)*	*Vuong's Z-statistic*
Day 0	0.0214	−0.0164	0.0164
	(0.0060)	(0.0342)	(0.0002)
Day +1	0.0304	−0.0360	0.0284
	(0.0001)	(0.0001)	(0.0001)
Day +2	0.0069	−0.0315	0.0161
	(0.3728)	(0.0001)	(0.0002)
Days 0 to +1	0.0339	−0.0137	0.0207
	(0.0001)	(0.0791)	(0.0001)
Days 0 to +2	0.0281	−0.0112	0.0170
	(0.0003)	(0.1500)	(0.0001)

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[a] The Z-statistic is based on Vuong's (1989) likelihood ratio test. The Z-statistic tests the difference between two sets of pairwise correlations. In Panels A and B, a positive and significant Z indicates that FERW is more positively associated with SMALLAT than with LARGEAT. Parenthetical number are p-values. For the Z-statistic, the p-values derive from one-tailed significance tests. All other p-values derive from two-tailed significance tests.

[b] SMALLAT is the small traders' abnormal trading response, while LARGEAT is the large traders' abnormal trading response. I measured trading response using two different trading response metrics: (1) the total number of trades in investor group j during observation interval of length t for sample firm i (A_NUMBER_TRADES$_{ijt}$), and (2) the total number of shares traded (trading volume) in investor group j during observation interval of length t for sample firm i (A_SHARES_TRADED$_{ijt}$). The abnormal trading response using number of trades is defined as:

$$\text{A\_NUMBER\_TRADES}_{ijt} = \frac{\begin{array}{l}\text{Number of firm i trades by}\\ \text{investor group j during earnings}\\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average number of firm i trades}\\ \text{by investor group j during}\\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i trades by investor group j during the year}} \times 100,$$

(*Continued on next page*)

TABLE 2 (Continued)

where j = 0 indicates small traders, while j = 1 indicates large traders. Panel A reports results where the abnormal trading response is based on total number of trades. Similarly, the abnormal trading response metric using the total number of shares traded or trading volume is defined as:

$$A\_SHARES\_TRADED_{ijt} = \frac{\text{Trading volume for firm i in investor group j during earnings announcement interval of length t} - \text{Average trading volume for firm i in investor group j during observation interval of length t}}{\text{Total number of firm i shares traded by investor group j during the year}} \times 100.$$

Panel B reports results where the abnormal trading response is based on trading volume.

The trades are assigned to small and large traders' groups as follows: (1) Obtain the firm's closing price as of December 30. (2) Compare the closing price to \$5,000, and determine the largest number of round-lot shares that is less than or equal to \$5,000. Trades of this number of shares or less are classified as small trades. (3) Similarly, determine the cutoff for large trades by comparing the closing price to \$50,000, and determine the smallest number of round-lot shares that is greater than or equal to \$50,000. Trades of this number of shares or more are classified as large trades.

[c] Day 0 is the earnings announcement day.

[d] FERW is defined as the absolute value of the difference between the actual quarterly EPS, and the EPS for the corresponding quarter of the previous year, deflated by the actual quarterly EPS and expressed as a percentage.

reports correlations between SMALLAT and FERW. FERW is significantly positively correlated with SMALLAT ($p \leq 0.006$) for all observation intervals except Day +2 in both panels. In contrast, the second column of Table 2 shows that the unconditional correlations between FERW and LARGEAT are either insignificant or negative. Subsequent analysis (reported in Table 3) shows that after controlling for analyst forecast errors, contemporaneous returns and market-wide trading, FERW is largely unrelated to LARGEAT. Finally, the last column of Table 3 reports Vuong's Z-statistic. Z is significantly positive ($p \leq 0.0009$) for all observation intervals in both panels. This suggests that the seasonal random-walk forecast errors are significantly more positively associated with small traders' trading response than with large traders' trading response to earnings announcements. In sum, the descriptive unconditional correlations reveal that small traders' abnormal trading response increases in the absolute seasonal random-walk forecast errors, whereas large traders' abnormal trading response does not.

Regression Results

To conduct formal tests of the hypotheses, I estimate the following models:

$$\text{Model 1: SMALLAT} = \alpha_0 + \alpha_1 \text{ FERW} + \alpha_2 \text{ FEA} + \alpha_3 D_P \times \text{RETURN} + \alpha_4 D_N \times \text{RETURN} + \alpha_5 \text{ MKTVOL} + \varepsilon_S,$$

$$\text{Model 2: LARGEAT} = \beta_0 + \beta_1 \text{ FERW} + \beta_2 \text{ FEA} + \beta_3 D_P \times \text{RETURN} + \beta_4 D_N \times \text{RETURN} + \beta_5 \text{ MKTVOL} + \varepsilon_L,$$

where D_P and D_N are indicator variables such that D_P is 1 if returns are 0 or positive, and

TABLE 3
Regressions of Small and Large Traders' Abnormal Trading Responses on Absolute Seasonal Random-Walk Forecast Error and Control Valuables[a]

Panel A: SMALLAT, LARGEAT Based on Number of Trades ($A\_NUMBER\_TRADES_{ijt}$)[b]

$$Model\ 1{:}\ SMALLAT = \alpha_0 + \alpha_1 FERW^c + \alpha_2 FEA + \alpha_3 D_p \times RETURN + \alpha_4 D_N \times RETURN + \alpha_5 MKTVOL + \varepsilon_S$$

		Control Variables				
Observation Intervals[d]	*FERW*	*FEA*	$D_P \times$ *RETURN*	$D_N \times$ *RETURN*	*MKTVOL*	*Adjusted* R^2*, F and p-values*
Day 0	0.0158	0.0033	0.2781	0.2125	0.0637	4.05%
	(1.885)	(0.392)	(23.862)	(18.272)	(8.299)	(140.590)
	[0.0297]	[0.6951]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +1	0.0246	0.0101	0.2260	0.1813	0.0821	3.35%
	(2.918)	(1.201)	(19.658)	(15.682)	(10.675)	(115.534)
	[0.0018]	[0.2296]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +2	0.0016	0.0133	0.2064	0.1273	0.0717	2.62%
	(0.188)	(1.569)	(18.193)	(11.135)	(9.308)	(89.849)
	[0.4253]	[0.1167]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +1	0.0218	0.0026	0.3923	0.3313	0.0706	5.45%
	(2.621)	(0.315)	(27.793)	(23.376)	(9.257)	(191.780)
	[0.0044)	[0.7527]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +2	0.0155	0.0045	0.4189	0.3411	0.0669	5.78%
	(1.858)	(0.536)	(29.103)	(23.429)	(8.788)	(203.800)
	[0.0316]	[0.5920]	[0.0001]	[0.0001]	[0.0001]	[0.0001]

$$Model\ 2{:}\ LARGEAT = \beta_0 + \beta_1\ FERW + \beta_2\ FEA + \beta_3\ D_P \times RETURN + \beta_4\ D_N \times RETURN + \beta_5\ MKTVOL + \varepsilon_L$$

		Control Variables				
Observation Intervals	*FERW*	*FEA*	$D_P \times$ *RETURN*	$D_N \times$ *RETURN*	*MKTVOL*	*Adjusted* R^2*, F and p-values*
Day 0	−0.0081	−0.0278	0.3622	0.2481	0.0640	6.44%
	(−0.980)	(−3.361)	(31.477)	(21.457)	(8.457)	(228.817)
	[0.3272]	[0.0008]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +1	−0.0213	−0.0326	0.2889	0.1920	0.0752	4.72%
	(−2.552)	(−3.903)	(25.319)	(16.730)	(9.843)	(165.059)
	[0.0107]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +2	−0.0147	−0.0312	0.2858	0.1651	0.0665	4.58%
	(−1.752)	(−3.731)	(25.449)	(14.588)	(8.720)	(158.809)
	[0.0897]	[0.0002]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +1	−0.0095	−0.0262	0.4617	0.3547	0.0668	7.12%
	(−1.153)	(−3.173)	(33.002)	(25.247)	(8.832)	(254.697)
	[0.2491]	[0.0015]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +2	−0.0080	−0.0159	0.4728	0.3568	0.0667	7.20%
	(−0.973)	(−1.935)	(33.104)	(24.695)	(8.831)	(258.129)
	[0.3305]	[0.0530]	[0.0001]	[0.0001]	[0.0001]	[0.0001]

(*Continued on next page*)

TABLE 3 (Continued)

Panel B: SMALLAT, LARGEAT Based on Trading Volume ($A\_SHARES\_TRADED_{ijt}$)

$$\text{Model 1: } SMALLAT = \alpha_0 + \alpha_1\, FERW + \alpha_2\, FEA + \alpha_3\, D_P \times RETURN + \alpha_4\, D_N \times RETURN + \alpha_5\, MKTVOL + \varepsilon_S$$

		Control Variables				
Observation Intervals	*FERW*	*FEA*	D_P × *RETURN*	D_N × *RETURN*	*MKTVOL*	*Adjusted* R^2, *F and p-values*
Day 0	0.0134	0.0044	0.2843	0.2163	0.0614	4.16%
	(1.625)	(0.530)	(24.411)	(18.557)	(8.015)	(144.570)
	[0.0520]	[0.5959]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +1	0.0220	0.0095	0.2335	0.1851	0.0796	3.44%
	(2.617)	(1.124)	(20.319)	(16.023)	(10.357)	(118.767)
	[0.0044]	[0.2611]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +2	0.0006	0.0108	0.2108	0.1296	0.0740	2.74%
	(0.068)	(1.284)	(18.593)	(11.345)	(9.618)	(94.094)
	[0.4730]	[0.1991]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +1	0.0203	0.0034	0.3992	0.3346	0.0685	5.57%
	(2.445)	(0.406)	(28.295)	(23.619)	(8.979)	(195.996)
	[0.0072]	[0.6846]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +2	0.0138	0.0062	0.4221	0.3400	0.0662	5.85%
	(1.665)	(0.746)	(29.343)	(23.358)	(8.703)	(206.443)
	[0.0480]	[0.4559]	[0.0001]	[0.0001]	[0.0001]	[0.0001]

$$\text{Model 2: } LARGEAT = \beta_0 + \beta_1\, FERW + \beta_2\, FEA + \beta_3\, D_P \times RETURN + \beta_4\, D_N \times RETURN + \beta_5\, MKTVOL + \varepsilon_L$$

		Control Variables				
Observation Intervals	*FERW*	*FEA*	D_P × *RETURN*	D_N × *RETURN*	*MKTVOL*	*Adjusted* R^2, *F and p-values*
Day 0	−0.0027	−0.0509	0.3259	0.2427	0.0609	5.51%
	(−0.329)	(−6.112)	(28.176)	(20.695)	(7.998)	(192.968)
	[0.7420]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +1	−0.0191	−0.0523	0.2605	0.1852	0.0785	4.26%
	(−2.283)	(−6.243)	(22.767)	(16.104)	(10.259)	(148.192)
	[0.0225]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Day +2	−0.0140	−0.0481	0.2443	0.1470	0.0719	3.76%
	(−1.662)	(−5.728)	(21.665)	(12.396)	(9.394)	(130.370)
	[0.0970]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +1	−0.0071	−0.0452	0.4039	0.3331	0.0665	5.68%
	(−0.851)	(−5.432)	(28.648)	(23.528)	(8.733)	(200.227)
	[0.3946]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Days 0 to +2	−0.0081	−0.0339	0.3954	0.3196	0.0680	5.26%
	(−0.971)	(−4.065)	(27.398)	(21.888)	(8.911)	(184.522)
	[0.3317]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]

(*Continued on next page*)

TABLE 3 (Continued)

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[a] Table values report multiple regression results. The percentages in the last column are overall model adjusted R^2 values. The equations are estimated by ordinary least squares after rank-transformation of dependent and independent variables as suggested by Cheng et al. (1992). The parenthetical numbers in the last column are overall model F-statistics; all other parenthetical numbers are t-statistics. Probabilities in brackets are one-tailed for the coefficient of FERW in Model 1 (α_1); all other probabilities are from two-tailed tests.

[b] SMALLAT is the small traders' abnormal trading response, while LARGEAT is the large traders' abnormal trading response. I measured trading response using two different trading response metrics: (1) the total number of trades in investor group j during observation interval of length t for sample firm i ($A\_NUMBER\_TRADES_{ijt}$), and (2) the total number of shares traded (trading volume) in investor group j during observation interval of length t for sample firm i ($A\_SHARES\_TRADED_{ijt}$). The abnormal trading response using number of trades is defined as:

$$A\_NUMBER\_TRADES_{ijt} = \frac{\begin{array}{l}\text{Number of firm i trades by} \\ \text{investor group j during earnings} \\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average number of firm i trades} \\ \text{by investor group j during} \\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i trades by investor group j during the year}} \times 100,$$

where j = 0 indicates small traders, while j = 1 indicates large traders. Panel A reports results where the abnormal trading response is based on total number of trades. Similarly, the abnormal trading response metric using the total number of shares traded or trading volume is defined as:

$$A\_SHARES\_TRADED_{ijt} = \frac{\begin{array}{l}\text{Trading volume for firm i in} \\ \text{investor group j during earnings} \\ \text{announcement interval of length t}\end{array} - \begin{array}{l}\text{Average trading volume for} \\ \text{firm i in investor group j during} \\ \text{observation interval of length t}\end{array}}{\text{Total number of firm i shares traded by investor group j during the year}} \times 100.$$

Panel B reports results where the abnormal trading response is based on trading volume.

The trades are assigned to small and large traders' groups as follows: (1) Obtain the firm's closing price as of December 30. (2) Compare the closing price to $5,000, and determine the largest number of round-lot shares that is less than or equal to $5,000. Trades of this number of shares or less are classified as small trades. (3) Similarly, determine the cutoff for large trades by comparing the closing price to $50,000, and determine the smallest number of round-lot shares that is greater than or equal to $50,000. Trades of this number of shares or more are classified as large trades.

[c] FERW is defined as the absolute value of the difference between the actual quarterly EPS and the EPS for the corresponding quarter of the previous year, deflated by the actual quarterly EPS. FEA is defined as the absolute value of the difference between actual quarterly EPS and the most recent analyst forecast, deflated by actual quarterly EPS. RETURN is the absolute value of contemporaneous, firm-specific, raw returns over respective observation intervals. D_P and D_N are indicator variables such that D_P is 1 if returns are 0 or positive and 0 otherwise, while D_N is 1 if returns are negative and 0 otherwise. Finally, MKTVOL is the percentage of NYSE/AMEX shares traded over respective observation intervals.

[d] Day 0 is the earnings announcement day.

0 otherwise; whereas D_N is 1 if returns are negative, and 0 otherwise. Hypothesis 1 suggests that α_1 should be significantly positive, while H2 suggests that β_1 should not be significantly different from 0. To mitigate the effects of skewness in the data and the sensitivity of the results to outliers, I use rank transformations of both dependent and independent variables, following Cheng et al. (1992). Estimation using log-transformed values of the variables yields identical inferences.[15]

Table 3 reports the multiple regression results. Panel A reports the results where SMALLAT and LARGEAT are based on *number of trades* (A_NUMBER_TRADES), while Panel B reports results where they are based on *trading volume* (A_SHARES_TRADED). For small traders (SMALLAT), Panel A shows that the FERW coefficient is significantly positive for all observation intervals ($p \leq 0.032$) except Day +2. Similarly, Panel B shows that for small traders, the FERW coefficient is positive and significant ($p \leq 0.052$) for all observation intervals except Day +2. These results indicate that, as H1 predicts, small traders' abnormal trading (SMALLAT) increases with the absolute seasonal random-walk forecast errors, even after controlling for absolute analyst forecast errors, contemporaneous firm-specific returns, and market-wide trading. In contrast, for large traders (LARGEAT), the FERW coefficient is not positive in any of the observation intervals in either panel. In four out of five observation intervals, it is insignificantly different from 0, and in one interval (Day +1), it is significantly negative. This suggests that large traders' abnormal trading is largely unrelated to seasonal random-walk forecast errors (consistent with H2), after controlling for absolute analyst forecast errors, firm-specific returns, and market-wide trading.

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[15] To avoid taking the logarithm of negative and zero numbers, I follow Ajinkya and Jain (1989) and Richardson et al. (1986), and add a small positive constant to the trading, forecast error, and returns variables.

Surprisingly, for large traders, the FEA coefficient is significantly negative for all observation intervals in both panels. Additional analysis (not tabulated) after partitioning the sample into quartiles based on firm size reveals that this negative association between LARGEAT and FEA occurs only in the smallest quartile of firms. This implies that the more surprising a small firm's earnings announcement relative to recent analysts' forecasts, the more likely large traders are to refrain from trading the firm's shares for at least a few days after the earnings announcement. Finally, as expected, coefficients on the absolute value of positive returns ($D_P \times$ RETURN), absolute value of negative returns ($D_N \times$ RETURN), and market-wide trading (MKTVOL) are all significantly positive in all observation intervals in both panels. In addition, the coefficient on the absolute value of positive returns significantly exceeds the coefficient on the absolute value of negative returns ($p \leq 0.001$), consistent with prior research (e.g., Karpoff 1987).

To assess the results' sensitivity to serial dependence among observations, I calculated the Durbin-Watson d-statistic for each equation for all observation intervals. The lowest Durbin-Watson d-statistic is 1.77, so the study's inferences are not likely to be affected by serial dependence (Greene 1993, 424). Nevertheless, I re-computed the significance levels reported in Table 3 using Froot's (1989) procedure, which adjusts the variance-covariance matrix for dependence among observations within prespecified subsets of the data, by allowing nonzero covariances within each subset. I partitioned the data to allow nonzero covariances among all observations of a firm within a year. The inferences remain unchanged. Finally, the variance inflation factors for FERW and FEA are less than 2, so the study's inferences are not likely to be affected by multicollinearity (Montgomery and Peck 1991).

In summary, Table 3 reveals that even after controlling for analyst forecast errors, contemporaneous price changes, and market-wide trading, small traders' abnormal trading response increases in the absolute seasonal random-walk forecast errors, while large traders' abnormal trading response does not.

Seemingly Unrelated Regression Results

I estimated Models 1 and 2 simultaneously using Zellner's (1962) Seemingly Unrelated Regression (SUR) estimation to compare parameter estimates across equations. Although this technique provides little efficiency gain because both equations have the same set of regressors, it permits tests involving parameters in different equations. Since H1 and H2 suggest that the coefficient of FERW in Model 1 (α_1) should exceed the coefficient of FERW in Model 2 (β_1), I test the following relation: $\alpha_1 - \beta_1 > 0$.

Table 4 reports the resulting t-statistics and one-tailed probabilities (in parentheses). This table reveals that α_1 is significantly greater than β_1 ($p \leq 0.05$) for all five observation intervals when I base the abnormal trading response on *number of trades*. For abnormal

TABLE 4
Seemingly Unrelated Regression (SUR) Estimation Results for the Full Sample[a]

$$\text{Model 1: } SMALLAT = \alpha_0 + \alpha_1\, FERW + \alpha_2\, FEA + \alpha_3\, D_P \times RETURN + \alpha_4\, D_N \times \text{RETURN} + \alpha_5\, MKTVOL + \varepsilon_S$$

$$\text{Model 2: } LARGEAT = \beta_0 + \beta_1\, FERW + \beta_2\, FEA + \beta_3\, D_P \times RETURN + \beta_4\, D_N \times \text{RETURN} + \beta_5\, MKTVOL + \varepsilon_L{}^{b}$$

Observation Intervals[c]	*Abnormal Trading Response Based on A_NUMBER_TRADES*$_{ijt}$	*Abnormal Trading Response Based on A_SHARES_TRADED*$_{ijt}$
	$\alpha_1 - \beta_1 > 0$	$\alpha_1 - \beta_1 > 0$
Day 0	2.4893 (0.0064)	1.6083 (0.0532)
Day +1	4.7282 (0.0001)	4.1011 (0.0001)
Day +2	1.6406 (0.0504)	1.4159 (0.0784)
Days 0 to +1	3.4303 (0.0003)	2.8496 (0.0022)
Days 0 to +2	2.6306 (0.0042)	2.2873 (0.0111)

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[a] Model 1 and Model 2 are simultaneously estimated for the full sample using Seemingly Unrelated Regression Estimation (Zellner 1962) to compare parameter estimates across equations. Specifically, the following relation is tested: $\alpha_1 - \beta_1 > 0$. The table values show t-statistics. The probabilities (in parentheses) are from one-tailed tests.

[b] The variables are defined in the previous tables.

[c] Day 0 is the earnings announcement day.

trading response based on *trading volume*, α_1 is again significantly greater than β_1 for all observation intervals except Day +2. These results indicate that absolute seasonal random-walk forecast errors are more positively associated with small traders' trading response than with large traders' trading response.

Analyses after Partitioning the Sample Based on Firm Size and Analyst Following

This study hypothesizes that the segment of the market that depends on the readily available seasonal random-walk model is likely to be disproportionately populated by small traders because the seasonal random-walk is one of the least costly information sources. An extension of this argument suggests that small traders are more likely to rely on the seasonal random-walk model for firms without rich predisclosure information environments, as it is more costly to acquire predisclosure information for these firms. For example, the *Wall Street Journal* mentions large firms more often than small firms (Atiase 1987; Grant 1980). Likewise, it is more costly to acquire analyst forecasts for firms with low analyst following. Therefore, the association between SMALLAT and FERW is likely to be strongest for small firms and firms with relatively little analyst following.

Table 5 reports the results of estimating Model 1 after partitioning the sample into quartiles based on firm size (year-end price multiplied by the total shares of common stock

TABLE 5
Regression of Small Traders' Abnormal Trading Response on Absolute Seasonal Random-Walk Forecast Error and Control Variables after Partitioning the Sample Based on Firm Size and Analyst Following[a]

$$\text{Model 1: } SMALLAT = \alpha_0 + \alpha_1\, FERW + \alpha_2\, FEA + \alpha_3\, D_P \times RETURN + \alpha_4\, D_N \times RETURN + \alpha_5\, MKTVOL + \varepsilon_S$$

Panel A: Coefficient of FERW (α_1) across Firm-Size Quartiles

Observation Intervals	*Q1-Smallest*	*Q2*	*Q3*	*Q4-Largest*
Day 0	0.0451	0.0322	0.0203	−0.0340
	(2.671)	(1.911)	(1.206)	(−2.058)
	[0.0038]	[0.0281]	[0.1139]	[0.9802]
Day +1	0.0441	0.0360	0.0134	0.0072
	(2.597)	(2.131)	(0.794)	(0.430)
	[0.0047]	[0.0166]	[0.2136]	[0.3336]
Day +2	0.0296	0.0401	−0.0230	−0.0281
	(1.739)	(2.366)	(−1.359)	(−1.677)
	[0.0410]	[0.0090]	[0.9129]	[0.9532]
Days 0 to +1	0.0525	0.0420	0.0141	−0.0200
	(3.124)	(2.519	(0.845)	(−1.222)
	[0.0009]	[0.0059]	[0.1991]	[0.8892]
Days 0 to +2	0.0388	0.0481	0.0040	−0.0245
	(2.322)	(2.885)	(0.241)	(−1.486)
	[0.0101]	[0.0020]	[0.4049]	[0.9314]

Panel B: Coefficient of FERW (α_1) across Analyst Following Quartiles

Observation Intervals	*Q1-Smallest*	*Q2*	*Q3*	*Q4-Largest*
Day 0	0.0178	0.0310	0.0275	−0.0174
	(1.012)	(1.825)	(1.670)	(−1.048)
	[0.1559]	[0.0340]	[0.0475]	[0.8526]
Day +1	0.0265	0.0040	0.0470	0.0115
	(1.506)	(0.236)	(2.820)	(0.684)
	[0.0660]	[0.4068]	[0.0024]	[0.2470]
Day +2	0.0044	−0.0015	0.0029	−0.0016
	(0.249)	(−0.085)	(0.170)	(−0.096)
	[0.4018]	[0.5340]	[0.4324]	[0.5384]
Days 0 to +1	0.0289	0.0247	0.0403	−0.0097
	(1.647)	(1.467)	(2.461)	(−0.585)
	[0.0490]	[0.0712]	[0.0070]	[0.7207]
Days 0 to +2	0.0203	0.0062	0.0393	−0.0068
	(1.170)	(0.368)	(2.389)	(−0.411)
	[0.1211]	[0.7127]	[0.0085]	[0.6594]

(*Continued on next page*)

TABLE 5 (Continued)

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[a] In this table, small traders' abnormal trading response is based on number of trades. Variables in Model 1 are defined in the previous tables. Table values in Panel A represent the estimated FERW coefficient in Model 1 (α_1) across four quartiles based on firm size, while table values in Panel B represent the estimated FERW coefficient in Model 1 across four quartiles based on analyst following. Size is computed as the year-end price multiplied by the total shares of common stock outstanding for that firm on that day. The parenthetical numbers are t-statistics. The numbers in brackets are one-tailed probabilities.

outstanding at the end of the year), and the number of analysts following the firm. Specifically, this table reports estimated FERW coefficient for small traders, α_1, for each quartile based on size and analyst following. Table 5 reports results based on *number of trades* (A_NUMBER_TRADES). Results based on *trading volume* (A_SHARES_TRADED) are quite similar to those reported in Table 5, and so are not separately tabulated.

Panel A reports that estimated FERW coefficients for small traders, α_1, are generally more positive for smaller firms than for larger firms. For example, in the quartile of smallest firms (Q_1), α_1 is significantly positive for all five observation intervals. Except for Day +2, α_1 is significantly positive at $p \leq 0.01$, and on Day +2, α_1 is significantly positive at $p = 0.041$. Similarly, in Q_2, α_1 is positive and significant ($p \leq 0.028$) for all five observation intervals. However, α_1 is not significantly positive for any of the observation intervals in Q_3 and Q_4. I pool observations in Q_1 and Q_2 , and separately pool observations in Q_3 and Q_4, and use an indicator variable to test whether α_1 in the lower half of the firm size distribution is significantly greater than α_1 in the upper half. I find that α_1 in pooled Q_1-Q_2 significantly exceeds ($p \leq 0.042$) α_1 in pooled Q_3-Q_4 for all five time intervals. These results suggest that small traders are more likely to rely on the seasonal random-walk model for smaller firms than for larger firms.

Panel B reports estimates of α_1 across four quartiles based on analyst following. The panel reveals that α_1 is significantly positive in two of the observation intervals in Q_1 as well as in Q_2 (although rather weakly significant on Day +1 in Q_1, and on Days 0 to +1 in Q_2). Surprisingly, α_1 is significantly positive in four out of five observation intervals in Q_3, implying that seasonal random-walk forecast errors spur small traders even for firms with a moderate analyst following. For the quartile of the most heavily followed firms, however, α_1 is not significant in any of the observation intervals. Additionally, when I pool observations in Q_1 through Q_3 and compare those to observations in Q_4, I find that α_1 in pooled Q_1-Q_3 significantly exceeds α_1 ($p \leq 0.046$) in Q_4 in three out of five time intervals. Thus, small traders are unlikely to rely on the seasonal random-walk expectation model for firms with the heaviest analyst following.

Finally, to ensure that the implication of this study regarding small traders' reliance on the seasonal random-walk model is not merely an artifact of firm size (small firms having a relatively greater proportion of small traders than large firms), I reestimated Model 1 after including firm size as a control variable. The study's inferences remain unchanged.

In summary, the results in Table 5 show that the positive association between small traders' abnormal trading response and absolute seasonal random-walk forecast errors arises from small traders in firms with impoverished information environments (i.e., smaller firms or firms with little-to-moderate analyst following). For larger or heavily followed firms, for which predisclosure information is more readily available and is relatively less costly, small traders do not appear to anchor on seasonal random-walk earnings expectations.

VI. CONCLUSIONS

Prior research suggests that a segment of the market appears to rely on the seasonal random-walk earnings expectation model. This study hypothesizes that this segment of the market consists primarily of small traders who are likely to be less wealthy and less informed. The empirical results are largely consistent with the hypotheses. Small traders' abnormal trading increases in the absolute seasonal random-walk forecast errors, even after controlling for absolute analyst forecast errors, contemporaneous price changes, and market-wide trading around earnings announcements. In contrast, large traders' abnormal trading response is not positively associated with seasonal random-walk forecast errors. Supplementary analysis reveals that small traders tend to rely more heavily on the seasonal random-walk model for smaller firms. However, even small traders appear not to rely on the seasonal random-walk model for the largest and the most heavily followed firms.

These results may provide insight into post-earnings announcement drift. Bernard and Thomas (1990) argue that the drift is primarily attributable to a segment of the market that seems to anchor on a seasonal random-walk earnings expectation model. I find that this segment appears to consist primarily of small traders transacting in firms with relatively impoverished information environments (e.g., smaller firms or firms with low-to-moderate analyst following). Since prior research has shown that smaller firms attract a relatively greater proportion of small traders (Bhushan 1989; Lee and Radhakrishna 2000), the evidence reported here suggests that, in the absence of sufficient arbitrage forces, drift is likely to be more extensive for smaller firms. This is consistent with Foster et al.'s (1984) evidence that the magnitude of drift is inversely related to firm size.

This evidence, however, begs the question as to why large traders do not arbitrage on this opportunity, and in doing so eliminate the drift. Given Bhushan's (1989) conclusion that per-unit trading costs are, on average, higher for smaller firms than for larger firms, the costs of trading in small firms' stocks may outweigh profits large traders could derive from any arbitrage opportunities.[16] Future research could directly investigate whether post-earnings announcement drift is attributable to small traders' activities in small firms, and if so, why there are insufficient arbitrage forces to prevent such mispricing.

Like all research, this study is subject to limitations. Although theoretical and empirical evidence supports the validity of trade size as a proxy for investor wealth and informedness, it is nonetheless a noisy proxy, because investor orders are often batched or broken up. However, because publicly available databases do not report extensive information on investor orders, researchers typically rely on observed trades and quotes to infer investor characteristics (e.g., Cready 1988; Cready and Mynatt 1991; Lee 1992).[17] Another limitation is that although the primary results are statistically significant, the models have relatively low explanatory power, with adjusted R^2 values ranging from 2 percent to 7 percent. Although this level of explanatory power is comparable to event studies exploring price-earnings relations, the significant portion of the volume reaction that remains unexplained suggests that we have much to learn about the different dimensions of investor heterogeneity and how they affect trading around earnings announcements.

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[16] Bhushan (1989) argues that per-unit trading costs are relatively higher in small firms because: (1) a large trade in a large firm with high market value is more likely to pass as a liquidity trade than the same size trade in a smaller firm, and (2) small firms are generally not sufficiently liquid to support very large trades.

[17] The TORQ database distributed by the New York Stock Exchange is the only publicly available dataset that has information on investor orders. However, TORQ is quite limited in scope. The dataset covers only 144 NYSE firms over a three-month period from November 1990 to January 1991.

APPENDIX
MARKET MICROSTRUCTURE DETAILS

Trade and Quote Condition Codes

Trade and quote condition codes reported in the ISSM tapes contain information about the nature of the trade, or the market conditions surrounding the quotation. For example, a transaction known as a "cash sale" (an irregular trade that stipulates same-day clearing) carries the condition code "C." In this study, I use only trades with "Regular sale" condition codes. "Regular sale" condition codes represent trades resulting from continuous, two-sided auctions involving market orders, limit orders, and buys and sells against the specialists' inventories (different types of investor orders are discussed below).

Types of Investor Orders

The two most common types of customer orders are "market orders" and "limit orders." A market order is executed immediately at the best available price. Stock exchange regulations enjoin specialists to ensure immediate execution of market orders.[18] A limit order, on the other hand, is an order to buy or sell at a specified price. The specialist maintains a list of limit orders at various prices on each side of the current quote. Thus, when a market order arrives, the specialist can execute the order in three different ways: (1) match the order with an incoming market order (these are called "market crosses"), (2) match the order with a limit order from the "limit order book," or (3) buy or sell from his or her own inventory. If the first two choices are unavailable at any time, exchange rules require the specialist to exercise the third option.

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[18] The only exceptions are "stopped orders." When the specialist stops an order, the specialist guarantees a price at least as good as the prevailing price when the order is executed later.

REFERENCES

Ajinkya, B. B., and P. C. Jain. 1989. The behavior of daily stock market trading volume. *Journal of Accounting and Economics* 11 (November): 331–359.

American Institute of Certified Public Accountants (AICPA). 1973. *Objectives of Financial Statements*. New York, NY: AICPA.

Atiase, R. K. 1987. Market implications of predisclosure information: Size and exchange effects. *Journal of Accounting Research* 25 (Spring): 168–176.

Ball, R., and E. Bartov. 1996. How naïve is the stock market's use of earning information? *Journal of Accounting and Economics* 21 (June): 319–337.

Bamber, L. S. 1987. Unexpected earnings, firm size, and trading volume around quarterly earnings announcements. *The Accounting Review* 62 (July): 510–532.

———, and Y. S. Cheon. 1995. Differential price and volume reactions to accounting earnings announcements. *The Accounting Review* 70 (July): 417–441.

———, O. E. Barron, and T. L. Stober. 1997. Trading volume and different aspects of disagreement coincident with earnings announcements. *The Accounting Review* 72 (October): 575–597.

———, ———, and ———. 1999. Differential interpretations and trading volume. *Journal of Financial and Quantitative Analysis* 34 (September): 369–386.

Barclay, M. J., and J. B. Warner. 1993. Stealth trading and volatility: Which trades move prices? *Journal of Financial Economics* 34 (December): 281–305.

Bartov, E. 1992. Patterns in unexpected earnings as an explanation for post-announcement drift. *The Accounting Review* 67 (July): 610–622.

Bernard, V. L., and J. K. Thomas. 1989. Post-earnings announcement drift: Delayed price response or risk premium. *Journal of Accounting Research* 27 (Supplement): 1–36.

———, and ———. 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics* 13 (December): 305–340.

———, and H. N. Seyhun. 1997. Does post-earnings announcement drift in stock prices reflect a market inefficiency: A stochastic dominance approach. *Review of Quantitative Finance and Accounting* 9: 17–34.

———, J. K. Thomas, and J. Wahlen. 1997. Accounting-based stock price anomalies: Separating market inefficiencies from risk. *Contemporary Accounting Research* 14 (Summer): 89–136.

Bhushan, R. 1989. Firm characteristics and analyst following. *Journal of Accounting and Economics* 11 (July): 255–274.

Bloomfield, R. J., R. Libby, and M. W. Nelson. 1998. Confidence and the welfare of the less-informed investors. Working paper, Cornell University, Ithaca, NY.

Brown, L. D., and M. S. Rozeff. 1979. Univariate time-series models of quarterly accounting earnings per share: A proposed model. *Journal of Accounting Research* 17 (Spring): 179–189.

———, P. A. Griffin, R. L. Hagerman, and M. E. Zmijewski. 1987. Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings. *Journal of Accounting and Economics* 9 (April): 61–87.

Chan, L. K. C., and J. Lakonishok. 1993. Institutional trades and intraday stock price behavior. *Journal of Financial Economics* 33 (April): 173–189.

Cheng, A. C. S., W. S. Hopwood, and J. C. McKeown. 1992. Non-linearity and specification problems in unexpected earnings response regression model. *The Accounting Review* 67 (July): 579–598.

Cornell, B., and E. R. Sirri. 1992. The reaction of investors and stock prices to insider trading. *Journal of Finance* 47 (July): 1031–1059.

Cready, W. M. 1988. Information value and investor wealth: The case of earnings announcements. *Journal of Accounting Research* 26 (Spring): 1–27.

———, and P. G. Mynatt. 1991. The information content of annual reports: A price and trading response analysis. *The Accounting Review* 66 (April): 291–312.

Easley, D., and M. O'Hara. 1987. Price, trade size, and information in securities markets. *Journal of Financial Economics* 19 (September): 69–90.

El-Gazzar, S. M. 1998. Predisclosure information and institutional ownership: A cross-sectional examination of market revaluations during earnings announcement periods. *The Accounting Review* 73 (January): 119–129.

Foster, G., C. Olsen, and T. Shevlin. 1984. Earnings releases, anomalies, and the behavior of security returns. *The Accounting Review* 59 (October): 574–603.

———. 1986. *Financial Statement Analysis*. 2nd edition. Englewood Cliffs, NJ: Prentice Hall.

Freeman, R. N., and S. Tse. 1989. The multi-period information content of accounting earnings: Confirmations and contradictions of previous earnings reports. *Journal of Accounting Research* 27 (Supplement): 49–79.

Froot, K. A. 1989. Consistent covariance matrix estimation with cross-sectional dependence and heteroskedasticity in financial data. *Journal of Financial and Quantitative Analysis* 24 (September): 333–355.

Grant, E. B. 1980. Market implications of differential amounts of interim information. *Journal of Accounting Research* 18 (Spring): 255–268.

Greene, W. H. 1993. *Econometric Analysis*. 2nd edition. Englewood Cliffs, NJ: Prentice Hall.

Griffin, D., and A. Tversky. 1992. The weighting of evidence and the determinants of confidence. *Cognitive Psychology* 24 (July): 411–435.

Hand, J. R., and R. P. Beatty. 1992. The causes and effects of mandated accounting standards: SFAS No. 94 as a test of the level playing field theory. *Journal of Accounting, Auditing and Finance* 7 (Fall): 509–530.

Hasbrouck, J. 1988. Trades, quotes, inventories and information. *Journal of Financial Economics* 22 (December): 229–252.

———. 1991. Measuring the information content of stock trades. *Journal of Finance* 46 (March): 179–207.

Karpoff, J. M. 1987. The relation between price changes and trading volume: A survey. *Journal of Financial and Quantitative Analysis* 22 (March): 109–126.

Kross, W., G. Ha, and F. Heflin. 1994. A test of risk clientele effects via an examination of trading volume response to earnings announcements. *Journal of Accounting and Economics* 18 (July): 67–87.

Kyle, A. S. 1985. Continuous auction and insider trading. *Econometrica* 53 (November): 1315–1335.

Lee, C. M. C., and M. J. Ready. 1991. Inferring trade direction from intraday data. *The Journal of Finance* 46 (June): 733–746.

———. 1992. Earnings news and small traders: An intraday analysis. *Journal of Accounting and Economics* 15 (June/September): 265–302.

———, and B. Radhakrishna. 2000. Inferring investor behavior: Evidence from TORQ data. *Journal of Financial Markets* 3 (2): 83–111.

Lev, B. 1988. Toward a theory of equitable and efficient accounting policy. *The Accounting Review* 63 (January): 1–22.

Meulbroek, L. A. 1992. An empirical analysis of illegal insider trading. *The Journal of Finance* 47 (December): 1661–1699.

Mikhail, M. B., B. R. Walther, and R. H. Willis. 1999. Does forecast accuracy matter to security analysts? *The Accounting Review* 74 (April): 185–200.

Montgomery, D. C., and E. A. Peck. 1991. *Introduction to Linear Regression Analysis.* 2nd edition. New York, NY: Wiley.

Morse, D. 1981. Price and trading volume reaction surrounding earnings announcements: A closer examination. *Journal of Accounting Research* 19 (Autumn): 374–383.

O'Brien, P. C. 1988. Analysts' forecasts as earnings expectations. *Journal of Accounting and Economics* 10 (January): 53–83.

Ohlson, J. A. 1975. The complete ordering of information alternatives for a class of portfolio selection models. *Journal of Accounting Research* 13 (Autumn): 267–282.

Peterson, D. K., and G. F. Pitz. 1988. Confidence, uncertainty and the use of information. *Journal of Experimental Psychology: Learning, Memory and Cognition* 14 (January): 85–92.

Philbrick, D. R., and W. E. Ricks. 1991. Using value line and IBES analyst forecasts in accounting research. *Journal of Accounting Research* 29 (Autumn): 397–417.

Rendleman, R. J., Jr., C. P. Jones, and H. A. Latané. 1987. Further insight into the standardized unexpected earnings anomaly: Size and serial correlation effects. *The Financial Review* 22 (February): 131–144.

Richardson, G., S. E. Sefcik, and R. Thompson. 1986. A test of dividend irrelevance using volume reactions to a change in dividend policy. *Journal of Financial Economics* 17 (December): 313–333.

Vuong, Q. 1989. Likelihood ratio tests for model selection and non-nested hypotheses. *Econometrica* 57 (March): 307–333.

Walther, B. R. 1997. Investor sophistication and market earnings expectation. *Journal of Accounting Research* 35 (Autumn): 157–179.

Wilson, R. 1975. Informational economies of scale. *Bell Journal of Economics* 6 (Spring): 184–195.

Zellner, A. 1962. An efficient method of estimating seemingly unrelated regression and tests for aggregation bias. *Journal of the American Statistical Association* 57 (June): 34–368.

THE ACCOUNTING REVIEW
Vol. 76, No. 2
April 2001
pp. 245–262

In Search of Profits: Measuring Income from the Unrelated Commercial Use of a Tax-Exempt Organization's Assets

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ABSTRACT: Profits a tax-exempt organization earns from business activities that are not related to the organization's exempt purpose are subject to the unrelated business income tax (UBIT). This paper shows that when the taxable and tax-exempt activities are substitutes, taxable income exceeds the incremental pretax financial return from the unrelated business activity because the exempt organization cannot deduct the opportunity cost of lost exempt function revenues when computing UBIT. As a result, the exempt organization may: (1) reduce or eliminate its unrelated business activity, or (2) change the way it uses its assets for unrelated business purposes by licensing the use of its assets to an unrelated taxable organization in exchange for nontaxable royalties. The model shows that although UBIT may distort the way in which an exempt organization uses its assets, this distortion can increase social welfare.

Keywords: *unrelated business income tax; exempt organizations; income measurement.*

I. INTRODUCTION

This paper examines the income tax issues that arise when a tax-exempt, nonprofit organization uses assets that relate to its tax-exempt purpose to engage in commercial activities that are unrelated to its exempt purpose. For example, the National Geographic Society conducts tax-exempt activities, such as producing and selling *National Geographic Magazine*. However, the Society also engages in unrelated businesses, such as the production and sale to commercial television networks of exploration documentaries by

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I thank Rajesh Aggarwal, Evelyn Brody, Bob Hansen, Phillip Stocken, Robert Verrecchia, workshop participants at Tilburg University, the University of Pennsylvania, the 2000 Pac-10 doctoral consortium, and two anonymous referees for helpful comments.

Submitted February 2000
Accepted September 2000

a taxable, for-profit subsidiary of the Society.[1] Under current law, exempt organizations do not pay taxes on either: (1) the income from commercial activities related to its exempt purpose, or (2) income from passive investments. In contrast, the exempt organization must pay tax on income from commercial activities that are unrelated to its exempt purpose.

This unrelated business income tax (UBIT) requires the exempt organization to measure the income from the taxable activity. I model a setting in which the outputs from the related and unrelated activities are substitutes, and so the pricing strategies for the two activities are interdependent. Specifically, I consider three strategies the organization can follow in using its assets: (1) refrain from any unrelated commercial activities (no commercial use), (2) license the use of assets to an unrelated taxable entity in exchange for nontaxable royalties (passive commercial use), or (3) use the assets to actively engage in an unrelated business, either directly or via a taxable subsidiary (active commercial use).[2]

I determine the effects of UBIT by comparing the behavior of an exempt organization with and without UBIT. Without UBIT, the organization does not pay tax on either active or passive income from the unrelated commercial use of its assets. With UBIT, the organization pays tax on income from active use, but not on passive royalty income received from an unrelated party. If the organization receives a royalty from a taxable subsidiary, that royalty is subject to UBIT.

Previous research by Cordes and Weisbrod (1998), Sansing (1998), and Yetman (2000) examined settings in which exempt organizations incur common costs while engaging in both tax-exempt and taxable activities. They concluded that as a result of exempt organizations' incentives to allocate these costs to taxable activities, taxable income is less than the incremental financial return from the unrelated business. Thus, exempt organizations have an incentive to take advantage of their exempt status to pursue unrelated business activities, even when it is economically inefficient to do so.

The results in this paper differ from the findings of earlier UBIT research in three ways. First, in this study's setting, taxable income exceeds the pretax incremental financial returns from this unrelated business. The taxable unrelated business activity competes with the exempt commercial activities, creating an opportunity cost in the form of lost tax-exempt revenue. However, the exempt organization cannot deduct this opportunity cost when computing taxable income. The inability to deduct the opportunity cost of forgone exempt function revenue causes taxable income to exceed the incremental financial return from the unrelated business activity. This in turn discourages exempt organizations from using their assets to engage actively in unrelated businesses.

Second, previous research has examined the effects of UBIT in settings that limit the exempt organization to only two strategies: (1) use assets in a (taxable) active unrelated business, or (2) refrain entirely from unrelated commercial use of the assets. This paper expands the action set by investigating a third alternative—licensing the use of assets to an unrelated taxable firm in exchange for royalties that are not subject to UBIT (Internal Revenue Code §512(b)(2)).[3] That is, my model allows UBIT to alter the way exempt organizations use assets for unrelated commercial purposes by allowing the exempt organization to license assets to unrelated taxable entities. Licensing to an unrelated taxable entity effectively transforms taxable income from an unrelated business activity into a nontaxable royalty.

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[1] Other settings in which exempt organizations sell both taxable and tax-exempt goods and services include sales of merchandise in a museum's store (IRS Letter Ruling 9550003); merchandise sold by a zoo (IRS Letter Ruling 8252011); profits from product testing done by an exempt medical research organization (IRS Letter Ruling 8020009); and university-operated broadcasting facilities (*Iowa State University of Science and Technology*, Court of Claims, 500 F2d 508.)

[2] Tenenbaum (1996) presents both tax and nontax reasons for using a for-profit subsidiary to conduct business that is unrelated to the parent's exempt purpose.

[3] All statutory references are to the Internal Revenue Code of 1986, as amended.

Third, the analysis of the model shows that although UBIT distorts the exempt organization's use of its assets, this distortion has ambiguous effects on efficiency. Critics of UBIT argue that taxing royalty income received from a taxable subsidiary creates economically inefficient outcomes (Gutman 1999). However, because the exempt organization in this model is a monopolist, the course of action that maximizes the organization's profits is not necessarily socially optimal. Therefore, the fact that taxation distorts the organization's choices does not imply that the tax reduces efficiency.

The results of this study help inform the growing debate over the increasingly commercial behavior of exempt organizations (Sheppard 1994; Desilets 1996; Brady 2000). It shows that taxing royalties paid to an exempt organization by a taxable subsidiary is likely to either: (1) deter commercial use of the exempt organization's assets, or (2) induce exempt organizations to license their assets to unrelated for-profit organizations in exchange for nontaxable royalties.

Section II of the paper describes the history of UBIT. Section III describes the model and characterizes equilibrium behavior associated with no commercial use, active commercial use, and passive commercial use of the exempt organization's assets in the absence of UBIT. Section IV analyzes the effects of UBIT on the exempt organization's behavior. Section V examines the efficiency consequences of UBIT. Section VI concludes and discusses the model's limitations.

II. LEGISLATIVE HISTORY

Prior to 1950, tax-exempt organizations did not pay tax on profits from commercial activities that were unrelated to their exempt purpose. In 1950, Congress enacted the unrelated business income tax, which taxes net income from unrelated business activities carried on by exempt organizations (Internal Revenue Code §511(a)). However, income from passive investments, such as dividends, interest, rents, and royalties, is exempt from UBIT (§512(b)).

In response to these provisions, exempt organizations began to form taxable subsidiaries to operate their unrelated commercial enterprises. However, the exempt organization retained some of the assets used by its subsidiary, receiving rent and royalty payments from the subsidiary. The taxable subsidiary could deduct these payments, but they were not taxable to the exempt parent. Therefore, income from the unrelated commercial activities escaped tax to the extent that the taxable subsidiary paid rent and royalties to its exempt parent. The Internal Revenue Service (IRS) challenged this method of avoiding UBIT, but the courts upheld it in *Amon G. Carter Foundation v. United States* (1958) and *United States v. Robert A. Welch Foundation* (1964).

Congress responded in 1969 by enacting §512(b)(13) A. This new provision modified the UBIT rules to tax interest, rents, and royalties received from controlled subsidiaries, where control was defined as ownership of more than 80 percent of the taxable corporation's stock (§512(b)(13)(D)(i)(I)). However, the amended statute contained no ownership attribution rules, so exempt organizations adopted complicated ownership structures in which they had 100 percent indirect ownership, but less than 80 percent direct ownership of the taxable subsidiary. This enabled exempt organizations to avoid UBIT on payments of interest, rents, and royalties associated with their unrelated business activities. For example, IRS Letter Ruling 9542045, which appears to involve the taxable commercial operations of the National Geographic Society (Carson 1995), illustrates how organizations can use a complicated ownership structure to avoid paying tax on the receipt of royalty payments received from an indirectly controlled taxable subsidiary.

In 1997, Congress once again modified §512, lowering the ownership threshold from 80 percent to 50 percent and applying the constructive ownership rules in §318 to determine control. This revision to §512 prevents exempt organizations from avoiding UBIT on their unrelated business operations by conducting them through a taxable subsidiary.

This latest change in the law has sparked renewed debate over UBIT. Critics of the recent change ask why royalty payments for use of an exempt organization's assets paid by an unrelated for-profit entity should be taxed differently from the same payment for the use of the same assets by a related for-profit entity (Gutman 1999). Advocates of the current rules ask why an exempt organization that uses a controlled subsidiary to engage in unrelated business activities should be taxed differently from an exempt organization that engages in the activity directly (Schler 1999). While this paper cannot resolve that debate, it does shed light on the income measurement issues that arise and the efficiency implications of taxing income from unrelated business activities.

III. MODEL WITHOUT UBIT

A tax-exempt, nonprofit organization (N) engages in a variety of (unmodeled) activities that promote its exempt purpose under §501(c)(3). These activities provide N with a set of unique assets, which enable N to manufacture and sell products to a set of consumers at a variable cost v per unit. Examples of these assets include the film library and trademark of the National Geographic Society. Product characteristics, denoted α, are elements of the interval [0, 1]. The product with characteristic $\alpha = 0$ is related to N's exempt purpose under §501(c)(3), so any profits from the sale of that product are exempt from tax.[4] An example of this product is *National Geographic Magazine*. The sale of any product with characteristic $\alpha > 0$ yields taxable income. An example is an exploration video produced by a taxable subsidiary of the National Geographic Society to be broadcast on a commercial television network. No other firm can produce goods with the characteristics of α unless they acquire the right to use N's assets. Thus, N is a monopolist with respect to goods that require the use of its assets.[5] (Table 1 summarizes the notation used in this paper.)

Consumers, denoted x, are assumed to be distributed uniformly over the interval [0, 1]. The utility of consumer x for a product with characteristic α and price p is equal to $s - \theta(x - \alpha)^2 - p$ if one unit of a product with characteristic α is purchased, and 0 otherwise. No consumer wants to buy more than one unit. The parameter s represents the gross surplus received by a consumer for one's most preferred product (i.e., when $\alpha = x$). The parameter θ represents the reduction in consumer surplus from using a product with a characteristic other than one's most preferred product. This loss of consumer surplus is increasing in the square of the distance from consumer x to the product with characteristic α.[6] I assume that $s > v + 3\theta$, which ensures that all consumers along the interval [0, 1] acquire the good at the equilibrium price, i.e., the market is "covered." This assumption ensures that the decisions regarding price and product characteristics of the exempt and taxable products are interdependent.

First, I consider the case in which N does not engage in any unrelated commercial use of its assets. In this setting, N only produces and sells one type of product, which has the

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[4] This normalization simplifies the analysis without qualitatively affecting the results. If the boundary separating exempt and taxable products were in the interior of the interval [0,1], then the effects of selling a taxable product in addition to the exempt product would be similar to those analyzed in the paper.

[5] Competition from a product sold by an unrelated third party would change the details but not the fundamental economic forces at work in the model. The assumption that the exempt organization is a monopolist is not crucial to the results, but does simplify the analysis.

[6] See Tirole (1988, chapter 7) for a discussion of this sort of product differentiation model.

TABLE 1
Definitions of Variables and Parameters in the Model

N = nonprofit, tax-exempt organization;
v = variable cost per unit;
α = product characteristic; $\alpha = 0$ for a product related to N's exempt purpose, and $\alpha = \hat{\alpha} > 0$ for a product unrelated to N's exempt purpose;
x = consumer's type;
p = price per unit;
s = gross consumer surplus from one's most-preferred product;
θ = loss of consumer surplus associated with a less-preferred product;
$\tilde{x}$ = type of consumer indifferent between products offered for sale;
c = incremental fixed cost of manufacturing an unrelated product;
F = for-profit, taxable organization;
R = per-unit royalty rate paid by F to N; and
L = fixed licensing fee paid by F to N.

characteristic $\alpha = 0$; it neither sells goods that are unrelated to its exempt purpose nor licenses its assets to another firm. N chooses a sales price p_E, where the subscript E indicates that the income from the sale is exempt from tax. I denote the consumer that is indifferent between buying and not buying the product $\alpha = 0$ at price p_E as $\tilde{x}$, which implies that $\tilde{x} = \sqrt{(s - p_E)/\theta}$ because $s - \theta(\tilde{x} - 0)^2 - p_E = 0$. All consumers in the interval $[0, \tilde{x}]$ will buy at that price, and no consumer in the interval $(\tilde{x}, 1]$ will buy at that price. The sales price chosen by N when all of its sales are related to its exempt purpose solves program E.[7]

$$\max_{p_E} \left\{ \int_0^{\tilde{x}} p_E - v \, dx \right\}$$

subject to: (Program E)

$$\tilde{x} = \sqrt{\frac{s - p_E}{\theta}}$$

$$\tilde{x} \leq 1$$

The solution to program E features N setting the price p_E just low enough so that all consumers acquire one unit of the good. Therefore, $\tilde{x} = 1$, $p_E^* = s - \theta$, and the profit N earns is $s - \theta - v$.[8]

Next, I consider the case in which N engages in the active unrelated commercial use of its assets by selling a product with characteristic $\alpha > 0$, denoted $\hat{\alpha}$, in addition to the product with characteristic $\alpha = 0$. The fixed cost of producing and selling an unrelated product is c_U. The advantage of offering two products is that N can command a higher price for each, because offering a second product reduces the distance between consumers and products. The disadvantage is that the second type of product increases N's costs by c_U.

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[7] The appropriate objective function for a nonprofit organization is an interesting issue. However, this model restricts its focus to N's pricing and product characteristic decisions related to its commercial activities. Profit maximization is a plausible objective in this decision context.

[8] If instead N chooses the price p_E that maximizes the objective function without regard to the constraint that $\tilde{x} \leq 1$, then it would choose $p_E^* = (2s + v)/3$, which implies $\tilde{x} = \sqrt{(s - v)/3\theta}$. However, the assumption that $s > v + 3\theta$ implies that the constraint $\tilde{x} \leq 1$ is binding.

N chooses sales prices p_E and p_U to maximize its combined financial return from the sale of the two products. The utility of consumer x is equal to $s - \theta x^2 - p_E$ if one unit with characteristic $\alpha = 0$ is purchased, $s - \theta(x - \hat{\alpha})^2 - p_U$ if one unit with characteristic $\hat{\alpha}$ is purchased, and is 0 otherwise. The consumer who is indifferent between the two products offered by N is the type $\tilde{x}$ that gets the same utility from each product, which implies:

$$s - \theta\tilde{x}^2 - p_E = s - \theta(\tilde{x} - \hat{\alpha})^2 - p_U. \tag{1}$$

Solving equation (1) yields $\tilde{x} = (p_U - p_E + \theta\hat{\alpha}^2)/2\theta\hat{\alpha}$, so when the prices of the exempt and unrelated products are equal, the indifferent consumer is equally distant from the two products.

N chooses the characteristic of the unrelated product, $\hat{\alpha}$, and the product prices, p_E and p_U, so as to solve program A when it engages in the active unrelated commercial use of its assets.

$$\max_{p_E, p_U, \hat{\alpha}} \left\{ \int_0^{\tilde{x}} p_E - v\, dx + \int_{\tilde{x}}^1 p_U - v\, dx - c_U \right\}$$

subject to:

$$\begin{aligned} \tilde{x} &= \frac{p_U - p_E + \theta\hat{\alpha}^2}{2\theta\hat{\alpha}} \\ 0 &\leq \hat{\alpha} \leq 1 \\ p_E &\leq s - \theta\tilde{x}^2 \\ p_U &\leq s - \theta(1 - \hat{\alpha})^2 \end{aligned} \tag{Program A}$$

The last two constraints in program A ensure that the prices p_E and p_U are sufficiently low that the two consumer types who are furthest away from the products being offered, located at $x = \tilde{x}$ and $x = 1$, are both willing to buy at least one of the products. Proposition 1 characterizes the solution to program A.

Proposition 1: When N sells both types of products:

(a) $\hat{\alpha}^* = \frac{2}{3}$;

(b) $p_E^* = s - \frac{\theta}{9}$; and

(c) $p_U^* = s - \frac{\theta}{9}$.

The proof appears in the Appendix.

The solution to program A shows that N's financial return is maximized when $\hat{\alpha} = 2/3$, because that point minimizes the average squared distance between consumers and their preferred product, i.e., $\hat{\alpha}^*$ minimizes $\int_0^{\tilde{x}} \theta x^2\, dx + \int_{\tilde{x}}^1 \theta(x - \hat{\alpha})^2\, dx$. The prices p_E and p_U extract all of the surplus from the consumers whose preferred product is furthest away from the products being offered (i.e., consumers located at $x = 1/3$ and $x = 1$ receive zero consumer surplus.) The financial return to N is $s - (\theta/9) - v - c_U$.

Next, suppose N uses its assets for unrelated commercial purposes in a passive manner by allowing an unrelated taxable for-profit entity, F, to use them to manufacture and sell a product to consumers in exchange for royalties paid to N. For example, the National Geographic Society could license its film library and trademark to an unrelated taxable firm, which in turn would produce a documentary for broadcast on a commercial television network. Access to N's unique assets allows F to produce and sell at a cost of v per unit, plus a fixed cost c_F.

The interaction between F and N occurs in three stages. First, F and N agree to a licensing arrangement in which F pays N a fixed licensing fee, L, plus a royalty R per unit that F sells.[9] Second, F chooses the characteristic α of the product that it intends to sell. Third, F and N engage in price competition to sell their differentiated products.

I assume that neither F nor N can commit at an earlier stage to a course of action to be taken at a later stage. For example, F cannot commit to its product's characteristic or price at the time it enters into the licensing arrangement. Therefore, I first solve for the players' equilibrium pricing strategies, taking the products' characteristics and the licensing arrangement as given. Second, I solve for F's optimal choice of its product's characteristic, $\hat{\alpha}$, anticipating the equilibrium pricing strategies and taking the licensing arrangement as given. Third, I solve for the optimal licensing arrangement.

Given a fixed licensing fee L, a per unit royalty rate R, product characteristics $\alpha = 0$ for N and $\alpha = \hat{\alpha}$ for F, and a tax rate t that F faces on its pretax income, F chooses its price p_F and N chooses its price p_E. As when N engages in the active unrelated commercial use of its assets, the consumer type $\tilde{x} = (p_F - p_E + \theta\hat{\alpha}^2)/2\theta\hat{\alpha}$ is indifferent between the product with characteristic $\alpha = 0$ offered by N and product $\alpha = \hat{\alpha}$ offered by F. This implies that consumers in the interval $[0, \tilde{x}]$ buy from N and consumers in the interval $(\tilde{x}, 1]$ buy from F.

N chooses p_E to solve the following profit maximization problem:

$$\max_{p_E} \left\{ \int_0^{\tilde{x}} (p_E - v)dx + L + \int_{\tilde{x}}^1 R\, dx \right\}. \tag{2}$$

Similarly, F chooses p_F to solve the following profit maximization problem:

$$\max_{p_F} \left\{ (1 - t)\left[\int_{\tilde{x}}^1 (p_F - R - v)dx - L - c_F \right] \right\}. \tag{3}$$

Substituting $\tilde{x} = (p_F - p_E + \theta\hat{\alpha}^2)/2\theta\hat{\alpha}$ and differentiating expressions (2) and (3) yields the following first-order conditions:

$$p_F - 2p_E + R - v + \theta\hat{\alpha}^2 = 0. \tag{4}$$

$$p_E - 2p_F + R + v + \theta\hat{\alpha}(2 - \hat{\alpha}) = 0. \tag{5}$$

Solving equations (4) and (5) yields equilibrium prices $p_E^* = R + v + [\theta\hat{\alpha}(2 + \hat{\alpha})]/3$

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[9] A two-part tariff (fixed fee of L plus a per unit royalty of R) entails no loss of generality. A constant marginal price R is optimal under certainty; see Tirole (1988, section 4.1.1).

and $p_F^* = R + v + [\theta\hat{\alpha}(4 - \hat{\alpha})]/3$. In each case, the greater the distance between N's product at $\alpha = 0$ and F's product at $\alpha = \hat{\alpha}$, the greater the price that both N and F can charge for their respective products. In other words, an increase in product differentiation decreases the intensity of price competition. The indifferent consumer is located at $\tilde{x} = (2 + \hat{\alpha})/6$.

Next, I find the product characteristic $\hat{\alpha}$ that F chooses in the second stage. Substituting the values of p_E^* and p_F^* into expression (3) and simplifying shows that F's payoff is:

$$(1 - t)\left[\frac{\theta\hat{\alpha}(4 - \hat{\alpha})^2}{18} - c_F - L\right]. \tag{6}$$

Differentiating expression (6) with respect to $\hat{\alpha}$ yields $[(1 - t)\theta(4 - \hat{\alpha})(4 - 3\hat{\alpha})]/18$, which is positive for all values of $\hat{\alpha}$ in the interval [0, 1]. Therefore, F locates at the opposite extreme from N in the product space to minimize the intensity of price competition, which implies $\hat{\alpha}^* = 1$.

In the first stage, N and F enter into a licensing and royalty arrangement. Because N owns the unique assets that make unrelated commercial use possible, I assume that N extracts the entire producer surplus created by this arrangement. Therefore, the licensing fee L and the per-unit royalty rate R maximize N's financial return subject to the constraint that it is in F's interest to participate in the arrangement, taking as given the product and pricing decisions to be made in the second and third stages.

Substituting the equilibrium values of p_E, p_F, and $\hat{\alpha}$ into expressions (2) and (3) yields the payoffs to N and F, respectively:

$$L + R + \frac{\theta}{2}. \tag{7}$$

$$(1 - t)\left[\frac{\theta}{2} - L - c_F\right]. \tag{8}$$

N chooses the values of L and R that solve program P when it engages in passive commercial use of its assets:

$$\max_{L,R}\left\{L + R + \frac{\theta}{2}\right\}$$

subject to:

$$\begin{aligned}&(1 - t)\left[\frac{\theta}{2} - L - c_F\right] \geq 0\\ &p_E \leq s - \theta\tilde{x}^2.\end{aligned} \qquad \text{(Program P)}$$

Program P indicates that N chooses L and R to maximize its own financial return, subject to two constraints. First, F must receive a nonnegative return, so that it is willing to engage in the arrangement with N. Second, all consumers must be willing to buy at the equilibrium prices, so consumer $\tilde{x}$ receives zero consumer surplus. The first constraint implies that expression (8) equals 0, and thus $L^* = (\theta/2) - c_F$. When N licenses its assets to F, $\hat{\alpha} = 1$, which implies $\tilde{x} = 1/2$. Therefore, the zero-consumer surplus condition requires $s - (\theta/4) = p_E$. Using this value of p_E in turn implies $R^* = s - v - (5\theta/4)$. N's financial payoff is $s - (\theta/4) - v - c_F$. Table 2 summarizes the payoffs to N for each use of its assets.

Proposition 2 establishes the conditions under which N refrains from using its assets for unrelated commercial purposes, engages in active unrelated commercial use of its assets, or engages in passive unrelated commercial use of its assets.

Proposition 2:

(a) If $c_F \geq 3\theta/4$ and $c_U \geq 8\theta/9$, then N does not engage in any unrelated commercial use of its assets.
(b) If $c_F < 3\theta/4$ or $c_U < 8\theta/9$, then:
   (i) N engages in active unrelated commercial use of its assets if

$$c_U - c_F < \frac{5\theta}{36};$$

   (ii) N engages in passive unrelated commercial use of its assets if

$$c_U - c_F \geq \frac{5\theta}{36}.$$

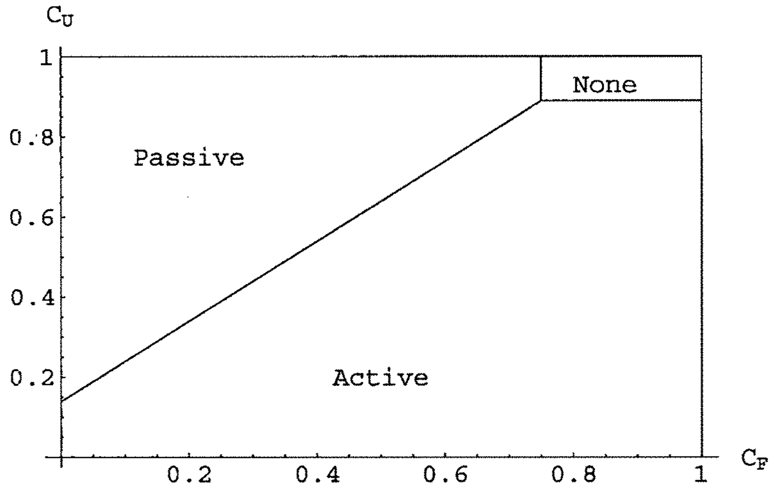
The proof follows immediately from the payoffs in Table 2.

Figure 1 graphically presents the results of Proposition 2, where the parameter θ has been normalized to 1. N's preferred strategy depends jointly on the level of and difference between the fixed costs c_U and c_F. If both costs are sufficiently high, then N refrains from both active and passive commercial activities that are not related to its exempt purpose. If either fixed cost is sufficiently low, then N will either actively use its assets to earn unrelated business income, or else license the use of its assets to an unrelated firm in exchange for royalties. If c_U is less than c_F, then N prefers active use to passive use. If c_F is sufficiently less than c_U, then N prefers passive use to active use. However, N prefers active use if c_U is just slightly larger than c_F. The reason is that in order to reduce the intensity of price competition, F chooses more product differentiation when it licenses the assets from N than N does when it actively engages in the unrelated business. Increased product differentiation reduces the surplus available to F and N, which in turn makes active use more attractive even though c_U is slightly greater than c_F.

TABLE 2
Payoff to N from Each Use of Its Assets without UBIT

No unrelated commercial use	$s - \theta - v$
Active unrelated commercial use	$s - \frac{\theta}{9} - v - c_U$
Passive unrelated commercial use	$s - \frac{\theta}{4} - v - c_F$

FIGURE 1
N's Optimal Unrelated Commercial Use of Its Assets without UBIT



C_U = fixed cost the exempt organization (N) incurs to make the product unrelated to its exempt purpose;

C_F = fixed cost the taxable organization (F) incurs to make the product unrelated to N's exempt purpose.

Active: Fixed costs for which N prefers to engage in active unrelated commercial use of its assets.
Passive: Fixed costs for which N prefers to license the use of its assets to F.
None: Fixed costs for which N prefers to refrain from either active or passive unrelated commercial use of its assets.

IV. TAXING INCOME FROM ACTIVE UNRELATED COMMERCIAL USE

This section examines the consequences of taxing income from N's active unrelated commercial use of its assets. Income from sales of the product with characteristic $\alpha = 0$ is related to N's exempt purpose, and is therefore not subject to UBIT. Income from passive commercial use is also nontaxable, because royalties are not subject to UBIT (§512(b)(2)), unless they are paid by a controlled organization (§512(b)(13)).

The taxable income from an active unrelated business is the revenue from the sales of the product considered to be unrelated (with characteristic $\hat{\alpha} > 0$), minus expenditures "directly connected" with the unrelated business (§512(a)(1)). In this setting, the directly connected expenditures are the variable costs of the taxable product sold, plus the fixed costs c_U. Restating program A to reflect the taxation from the sale of the product with characteristic $\hat{\alpha}$ yields the following program T:

$$\max_{p_E, p_U, \hat{\alpha}} \left\{ \int_0^{\hat{x}} (p_E - v)dx + (1 - t) \left[\int_{\hat{x}}^{1} (p_U - v)dx - c_U \right] \right\}$$

subject to:

$$\tilde{x} = \frac{p_U - p_E + \theta\hat{\alpha}^2}{2\theta\hat{\alpha}}$$

$$0 \leq \hat{\alpha} \leq 1 \qquad \text{(Program T)}$$

$$p_E \leq s - \theta\tilde{x}^2$$

$$p_U \leq s - \theta(1 - \hat{\alpha})^2.$$

As in the solution to program A, the last two constraints must be binding at the optimum. Substituting the constraints on $\tilde{x}$, p_E, and p_U from program T into the objective function yields the following simplified optimization program T*. Note that $\tilde{x} = 2\hat{\alpha} - 1$, which implies that the taxable product at $\hat{\alpha}$ is equally distant from the consumer at $x = 1$ and the indifferent consumer at $\tilde{x}$. It also implies that $\tilde{x}$ approaches 1 as $\hat{\alpha}$ approaches 1:

$$\max_{\hat{\alpha}} \begin{Bmatrix} (2\hat{\alpha} - 1)[s - v - \theta(2\hat{\alpha} - 1)^2] \\ +(1 - t)[2(1 - \hat{\alpha})[s - v - \theta(1 - \hat{\alpha})^2] - c_U] \end{Bmatrix}$$

subject to: $0 \leq \hat{\alpha} \leq 1.$ (Program T*)

There are two cases to consider. In the first case, the tax rate is sufficiently low that N actively engages in the sale of the unrelated product, despite UBIT. Proposition 3 summarizes the effects of UBIT in this case.

Proposition 3: Taxing the income from the production and sale of the unrelated product causes:

(a) $\hat{\alpha}^*$ and $\tilde{x}$ to increase;
(b) p_E to decrease;
(c) p_U to increase;
(d) N's pretax financial return to decrease.

The proof appears in the Appendix.

The intuition behind Proposition 3 is that N prefers tax-exempt income from the sale of the product with characteristic $\alpha = 0$ to taxable income from the product $\hat{\alpha} > 0$. Therefore, the tax induces N to increase $\hat{\alpha}$, thereby decreasing the fraction of consumers buying the taxable product. This increase in product differentiation also increases the price that N can charge for the taxable product (because the distance between $\hat{\alpha}^*$ and the consumer at $x = 1$ decreases) and decreases the price that N can charge for the tax-exempt product (because the distance between the tax-exempt product at $\alpha = 0$ and the consumer at $\tilde{x}$ increases.)

In the second case, taxing income from the active unrelated commercial use of N's assets entirely deters N from engaging in that activity. If the taxable income exceeds the pretax incremental financial return from the unrelated activity, then there exists a tax rate t for which the after-tax incremental financial return is negative even though the pretax incremental financial return is positive. Proposition 4 establishes the difference between taxable income and the pretax incremental financial return from the taxable unrelated business activity.

Proposition 4: Taxable income exceeds the incremental pretax financial return from active unrelated commercial use.
The proof appears in the Appendix.

Proposition 4 reflects the fact that the opportunity cost of lost exempt revenues from the decreased sales of products with characteristic $\alpha = 0$ is not tax deductible. As a result, taxable income from the active conduct of an unrelated business exceeds the incremental financial return. Thus, UBIT can deter N from engaging in active unrelated commercial use of its assets.

It is not the tax itself that distorts N's choices. If N could deduct the exempt function revenues that it lost because of the taxable activity, then the tax would simply transfer a portion of N's surplus to the government, with no effect on N's behavior. It is the fact that the unrelated business taxable income exceeds the incremental financial return from the unrelated business that causes UBIT to alter N's behavior.

V. EFFECTS OF UBIT ON EFFICIENCY

A tax that alters behavior frequently decreases social welfare, defined as the sum of consumer surplus, producer surplus, and tax revenues. In this setting, however, taxing the active unrelated commercial use of N's assets can increase social welfare, because the equilibrium without UBIT is not necessarily socially optimal.

UBIT can change N's behavior in one of three ways. First, UBIT can induce N to continue its unrelated business activity, but change its product and pricing strategies to sell more of the exempt product and less of the taxable product. Second, it can induce N to abandon its taxable activity entirely, and just make and sell the exempt product. Third, it can induce N to engage in passive unrelated commercial use by licensing its assets to an unrelated taxable entity in exchange for royalties.

To demonstrate the effects of UBIT on social welfare, consider social welfare associated with each of N's three strategies for using its assets in the absence of UBIT. First, suppose N refrains from using its assets for unrelated commercial purposes. The consumer surplus associated with N's decision to produce only the related product, given the equilibrium price, $p_E^* = s - \theta$, is $\int_0^1 s - \theta x^2 - p_E^* \, dx = 2\theta/3$. The analysis of program E showed that N's financial return is $s - v - \theta$, and so social welfare equals $s - v - \theta/3$ when N does not use its assets in unrelated commercial activities.

Next, consider the case in which N uses its assets to actively conduct an unrelated business. Consumer surplus associated with the solution to program A is:

$$\int_0^{1/3} s - \theta x^2 - p_E^* \, dx + \int_{1/3}^{1} s - \theta \left(x - \frac{2}{3}\right)^2 - p_U^* \, dx = \frac{2\theta}{27}. \tag{9}$$

The analysis of program A showed that N's financial return from active unrelated commercial use is $s - v - c_U - \theta/9$. Therefore, social welfare equals $s - v - c_U - \theta/27$ when N actively uses its assets in an unrelated business.

Finally, consider the case in which N licenses its assets to an unrelated firm. The consumer surplus associated with the solution to program P is:

$$\int_0^{1/2} s - \theta x^2 - p_E^* \, dx + \int_{1/2}^{1} s - \theta(1 - x)^2 - p_F^* \, dx. \tag{10}$$

Given R*, both output prices p_E and p_F equal $s - (\theta/4)$. Substituting these prices into equation (10) and integrating yields consumer surplus of $\theta/6$. The analysis of program P showed that N's financial return when it engages in passive unrelated commercial use is $s - v - c_F - (\theta/4)$. Therefore, social welfare is $s - v - c_F - (\theta/12)$ when N engages in passive unrelated commercial use of its assets. Table 3 summarizes social welfare associated with each of N's possible uses of its assets.

Proposition 5 indicates the use of N's assets that maximizes social welfare in the absence of UBIT.

Proposition 5:

(a) If $c_F \geq \theta/4$ and $c_U \geq 8\theta/27$, then social welfare is maximized if N does not engage in any unrelated commercial use of its assets.

(b) If $c_F < \theta/4$ or $c_U < 8\theta/27$, then:

  (i) If $c_U - c_F < 5\theta/108$, social welfare is maximized when N engages in active unrelated commercial use of its assets.

  (ii) If $c_U - c_F \geq 5\theta/108$, social welfare is maximized when N engages in passive unrelated commercial use of its assets.

The proof follows immediately from the payoffs in Table 3.

Figure 2 presents the results of Proposition 5. A comparison of Figures 1 and 2 shows that N engages in more unrelated commercial use of its assets than is socially optimal in the absence of UBIT. Offering two types of products enhances N's ability to extract surplus from consumers in the form of higher prices. However, the increase in N's financial return can be less than the reduction in consumer surplus, thereby decreasing social welfare.

Now consider the effect of UBIT on social welfare. Proposition 6 shows the consequences of the tax if N continues to engage in active unrelated commercial use of its assets despite the tax.

Proposition 6: When income from active unrelated commercial use is taxed and N actively engages in an unrelated business, then the tax decreases social welfare.

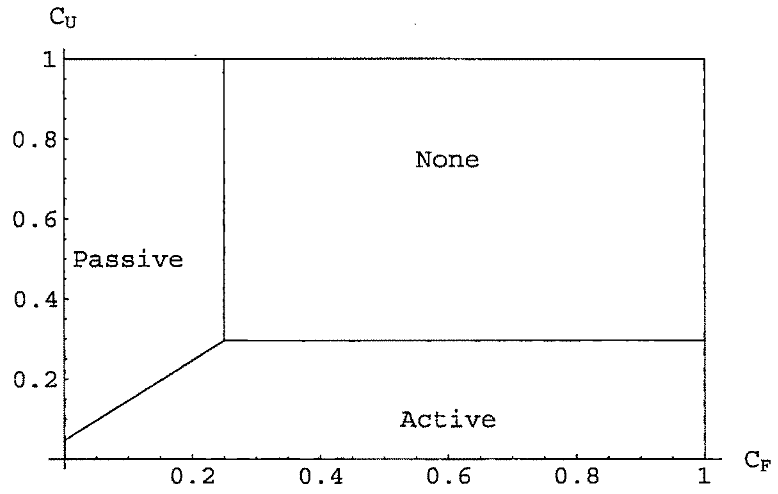
The proof appears in the Appendix.

Proposition 6 shows that when N actively engages in an unrelated business, the taxation of income from that business distorts N's choice of $\hat{\alpha}$. Because the optimal $\hat{\alpha}$ in the absence of UBIT minimizes the average squared distance between consumers and their most preferred product, the increase in $\hat{\alpha}$ because of UBIT reduces social welfare.

TABLE 3
Social Welfare from Each Use of N's Assets without UBIT

No unrelated commercial use	$s - \frac{\theta}{3} - v$
Active unrelated commercial use	$s - \frac{\theta}{27} - v - c_U$
Passive unrelated commercial use	$s - \frac{\theta}{12} - v - c_F$

FIGURE 2
Socially Optimal Unrelated Commercial Use of N's Assets without UBIT



C_U = fixed cost the exempt organization (N) incurs to make the product unrelated to its exempt purpose;

C_F = fixed cost the taxable organization (F) incurs to make the product unrelated to N's exempt purpose.

Active: Fixed costs for which it is socially optimal for N to engage in active unrelated commercial use of its assets.

Passive: Fixed costs for which it is socially optimal for N to license the use of its assets to F.

None: Fixed costs for which it is socially optimal for N to refrain from either active or passive unrelated commercial use of its assets.

Proposition 6 does not imply that UBIT always reduces social welfare, because it only applies when N engages in an active unrelated business despite UBIT. If instead N responds to UBIT by either refraining from any commercial use or engaging in passive commercial use of its assets, social welfare could either increase or decrease. Table 2 indicates that N prefers passive commercial use to no commercial use if $c_F < 3\theta/4$, and prefers no commercial use if $c_F \geq 3\theta/4$. Suppose $\theta = 1$, $c_U = 1/3$, and $c_F = 4/5$. Then Figures 1 and 2 imply that if UBIT deters active use, it enhances social welfare because N will respond by engaging in no commercial use, which is socially optimal. Similarly, if $\theta = 1$, $c_U = 1/3$, and $c_F = 1/5$, then UBIT enhances social welfare by deterring active use in favor of passive use. Therefore, for some values of c_F and c_U, UBIT can increase social welfare by deterring active commercial use in favor of either passive commercial use or no commercial use.

VI. CONCLUSIONS

Tax-exempt organizations pay tax on income from active unrelated commercial use of their assets. In contrast, exempt organizations do not pay tax on either income from commercial activities that are related to the exempt purpose or income from passive unrelated commercial activities. When taxable uses of the assets compete with tax-exempt uses, the taxable use decreases tax-exempt revenues. This imposes an opportunity cost on the exempt organization that is not deductible when computing UBIT. Taxable income from an active unrelated business therefore exceeds the pretax financial returns from that business. This result contrasts with earlier studies of UBIT, which had shown that when taxable and exempt activities involve common costs, the exempt organization could allocate more than the incremental costs to the taxable activities. Taxable income was therefore lower than the pretax financial returns from the unrelated business.

In this study's setting, where the income subject to tax exceeds the incremental financial return from the active unrelated business, the tax induces the exempt organization to: (1) continue its active unrelated commercial use at a reduced level, (2) refrain entirely from either active or passive unrelated commercial use, or (3) license the assets to an unrelated for-profit organization in exchange for nontaxable royalties. Therefore, UBIT may simply induce the exempt organization to change the way it engages in unrelated commercial activities, rather than reducing or eliminating unrelated business activity.

If UBIT does not deter the exempt organization from actively engaging in unrelated commercial use of its assets, then the distorting effect of taxation reduces social welfare. However, if UBIT induces the exempt organization to either engage in passive unrelated commercial use or refrain from any unrelated commercial use, then social welfare could either increase or decrease. Taxation could increase social welfare because the exempt organization's pricing and product characteristic decisions, in the absence of UBIT, may not be socially optimal.

The policy implications of this study are twofold. First, the effectiveness of UBIT when taxable and exempt activities are economically interdependent depends on whether the interdependence affects costs or revenues. Even if UBIT is ineffective in settings where the organization can allocate common costs so as to avoid it, as previous research has shown, UBIT can deter unrelated business activities when taxable activities decrease exempt function revenue.

Second, this study suggests that exempt organizations may respond in three ways to the 1997 tax law change that subjected royalty payments from controlled taxable subsidiaries to UBIT. First, this change could decrease active unrelated commercial use of assets. Second, it could deter entirely active unrelated commercial use. Third, it could induce exempt organizations to license their assets to unrelated for-profit firms, thereby converting taxable unrelated business income into a nontaxable royalty.

This study's model is based on several simplifying assumptions. In particular, I explore the effects of UBIT in a model that focuses on the price and product characteristics of two products that both require the exempt organization's assets. The distribution of consumer types is uniform and the cost to a consumer of using a product that differs from that consumer's most preferred product is quadratic. These assumptions enhance the tractability of the analysis, but do not change fundamental economic forces at work. The key assumption is that the exempt and unrelated activities are substitutes, which ensures that the taxable income from the unrelated business activity exceeds the pretax incremental financial return from that activity.

APPENDIX

Proof of Proposition 1

First, I show that the last two constraints in program (A) are binding at the optimal solution. Clearly at least one must bind; otherwise, both p_E and p_U can be increased by the same amount, increasing the objective function without changing $\tilde{x}$. Suppose the constraint on p_E is binding, but the constraint on p_U is not. Then for any $\hat{\alpha}$, fixing $p_E^* = s - \theta\tilde{x}^2$ and differentiating the objective function with respect to p_U yields optimal prices of $p_E^* = s - \theta(2 + \hat{\alpha})^2/16$ and $p_U^* = s - \theta(2 - 3\hat{\alpha})^2/16$. Substituting these prices into the objective function and differentiating with respect to $\hat{\alpha}$ yields $\hat{\alpha}^* = (9 - \sqrt{57})/6$. However, this implies that $p_U^* = s - \theta(53 - \sqrt{57})/96$, which violates the constraint $p_U \leq s - \theta(1 - \hat{\alpha})^2$. Next, suppose the constraint on p_U is binding, but the constraint on p_E is not. Then for any $\hat{x}$, fixing $p_U^* = s - \theta(1 - \hat{\alpha})^2$ and differentiating the objective function with respect to p_E yields optimal prices of $p_E^* = s - \theta(2 - 4\hat{\alpha} + \hat{\alpha}^2)/16$ and $p_U^* = s - \theta(1 - \hat{\alpha})^2$. Substituting these prices into the objective function and differentiating with respect to $\hat{\alpha}$ shows that the objective function is increasing in α throughout the interval [0, 1], and thus $\alpha^* = 1$. But this implies that $p_E^* = s + \theta/2$, which violates the constraint $p_E \leq s - \theta\hat{x}^2$. Therefore, both of the constraints on prices must bind at the solution.

Substituting the values $p_E = s - \theta\hat{x}^2$ and $p_U = s - \theta(1 - \hat{\alpha})^2$ into program (A) yields the following simplified optimization program:

$$\max_{\hat{x}} \{s - \theta(1 + 6\hat{\alpha}^2 - 6\hat{\alpha}^3)\}$$

$$\text{subject to:}$$

$$0 \leq \hat{\alpha} \leq 1. \tag{A1}$$

Differentiating the objective function in program (A1) yields a solution of $\hat{\alpha}^* = 2/3$. This in turn implies that $\hat{x} = 1/3$, and $p_E = p_U = s - \theta/9$. QED

Proof of Proposition 3

(a) Solving the program T* yields two possible solutions, depending on the value of t. Differentiating the objective function yields:

$$\hat{\alpha}^* = \frac{1 + t + \sqrt{1 - t + t(3 + t)\beta}}{3 + t}, \tag{A2}$$

where $\beta \equiv (s - v)/3\theta$. Note that because $s > v + 3\theta$, $\beta > 1$. If $t \geq 1/\beta$, then the constraint $\hat{\alpha} \leq 1$ in program (T*) is binding. Because $\hat{x} = 2\hat{\alpha} - 1$, UBIT deters all sales of the taxable product when the tax rate is sufficiently high. If $t < 1/\beta$, then the constraint $\hat{\alpha} \leq 1$ in program T* is not binding. Differentiating equation (A2) with respect to t yields:

$$\frac{\partial\hat{\alpha}^*}{\partial t} = \frac{9\beta - 5 + t(1 + 3\beta) + 4\sqrt{1 - t + \beta t(3 + t)}}{2(3 + t)^2\sqrt{1 - t + \beta t(3 + t)}}. \tag{A3}$$

Because $\beta > 1$, $\partial\hat{\alpha}^*/\partial t > 0$. Therefore, as t increases, $\hat{\alpha}^*$ and $\hat{x}$ also increase, which proves part (a).

(b) $p_E^* = s - \theta(2\hat{\alpha}^* - 1)^2$. Because $\hat{\alpha}^* = 2/3$ when $t = 0$ and is increasing in t, differentiation implies that $\partial p_E^*/\partial t = -4\theta(2\hat{\alpha}^* - 1)\ \partial\hat{\alpha}^*/\partial t < 0$.

(c) $p_U^* = s - \theta(1 - \hat{\alpha})^2$. Differentiation implies that $\partial p_U^*/\partial t = 2\theta(1 - \alpha^*)\ \partial\hat{\alpha}^*/\partial t > 0$.

(d) Proposition 1 showed that N's financial return is maximized when $\hat{\alpha} = 2/3$. Part (a) of this proposition implies that $\hat{\alpha} > 2/3$ when $t > 0$, and so the taxation of the unrelated product must decrease N's pretax financial return.

Proof of Proposition 4

There are two cases to consider. Proposition 2 implies that if $c_F \geq 3\theta/4$, N would prefer no unrelated commercial use to passive unrelated commercial use. N receives a financial return of $s - v - \theta$ if it engages in no unrelated commercial use of its assets. Therefore, the incremental pretax financial return from active unrelated commercial use is:

$$(2\hat{\alpha} - 1)[s - v - \theta(2\hat{\alpha} - 1)^2] + 2(1 - \hat{\alpha})[s - v - \theta(1 - \hat{\alpha})^2] - c_U - [s - v - \theta]. \tag{A4}$$

The first term in equation (A4) is the profit from the sale of the related product. The next two terms are the pretax profit from the sale of the unrelated product (contribution margin minus incremental fixed costs). The last term is financial return from no commercial use. In contrast, the taxable income is:

$$2(1 - \hat{\alpha})[s - v - \theta(1 - \hat{\alpha})^2] - c_U. \tag{A5}$$

Subtracting equation (A4) from equation (A5) and rearranging terms yields:

$$2(1 - \hat{\alpha})[s - v - \theta(1 - 2\hat{\alpha} + 4\hat{\alpha}^2)]. \tag{A6}$$

Equation (A6) is positive because $s > v + 3\theta$, and so the taxable income is greater than the incremental financial return from active unrelated commercial use of N's assets.

Proposition 2 also implies that if $c_F < 3\theta/4$, then N would prefer passive unrelated commercial use to no commercial use, and thus could achieve a financial return of $s - v - \theta/4 - c_F$ if it were to refrain from engaging in active unrelated commercial use of its assets. Therefore, the incremental pretax financial return from active unrelated commercial use is:

$$\begin{aligned}&(2\hat{\alpha} - 1)[s - v - \theta(2\hat{\alpha} - 1)^2] + 2(1 - \hat{\alpha})[s - v - \theta(1 - \hat{\alpha})^2]\\ &- c_U - \left[s - v - \frac{\theta}{4} - c_F\right].\end{aligned} \tag{A7}$$

Subtracting equation (A7) from equation (A5) and rearranging terms yields:

$$2(s - v)(1 - \hat{\alpha}) - \frac{5\theta}{4} - c_F + 2\hat{\alpha}\theta(3 - 6\hat{\alpha} + 4\hat{\alpha}^2). \tag{A8}$$

To see that equation (A8) is positive, substitute $s = v + 3\theta$ and rearrange terms to get:

$$\frac{\theta(19 - 48\hat{\alpha}^2 + 32\hat{\alpha}^3)}{4} - c_F. \tag{A9}$$

Because $\hat{\alpha} \leq 1$, the lower bound of equation (A9) is $3\theta/4 - c_F$, which implies that the taxable income is greater than the pretax incremental financial return when N prefers passive unrelated commercial use to no unrelated commercial use. QED

Proof of Proposition 6

Social welfare is the sum of N's pretax financial return and consumer surplus. N's pretax financial return is:

$$\tilde{x}(p_E - v) + (1 - \tilde{x})(p_U - v) - c_U. \tag{A10}$$

Substituting $\tilde{x} = 2\hat{\alpha} - 1$ and p_E and p_U from Proposition 1 into equation (A10) yields a pretax financial return of:

$$s - v - c_U - \theta(1 - 6\hat{\alpha}^2 + 6\hat{\alpha}^3). \tag{A11}$$

Consumer surplus is:

$$\int_0^{\tilde{x}} s - \theta x^2 - p_E^* \, dx + \int_{\tilde{x}}^1 s - \theta(x - \hat{\alpha})^2 - p_U^* \, dx. \tag{A12}$$

Substituting $\tilde{x} = 2\hat{\alpha} - 1$ and p_E and p_U from Proposition 1 into equation (A11) yields consumer surplus of:

$$\frac{2\theta}{3}[1 - 6\hat{\alpha}^2 + 6\hat{\alpha}^3]. \tag{A13}$$

Adding N's pretax financial return from equation (A11) to the consumer surplus from equation (A13) yields social welfare of:

$$s - v - c_U - \frac{\theta}{3}[1 - 6\hat{\alpha}^2 + 6\hat{\alpha}^3]. \tag{A14}$$

Equation (A14) is maximized when $\hat{\alpha} = 2/3$. Because $\hat{\alpha} = 2/3$ when $t = 0$ and is increasing in t, an increase in t decreases social welfare. QED

REFERENCES

Amon G. Carter Foundation v. United States, 58-1 USTC 9432 (1958).

Brady, D. 2000. When nonprofits go after profits. *Business Week* (June 26): 173–178.

Carson, M. 1995. Exploring the UBIT's frontier: A National Geographic production. *Tax Notes* 69 (December 18): 1432–1434.

Cordes, J., and B. Weisbrod. 1998. Differential taxation of nonprofits and the commercialization of nonprofit revenues. *Journal of Policy Analysis and Management* 17 (2): 195–214.

Desilets, R. 1996. Payments received for use of an exempt organization's name and logo: Royalties or UBIT? *The Exempt Organization Tax Review* 13 (June): 967–970.

Gutman, H. 1999. Taxing transactions between exempt parents and their affiliates. *Tax Notes* 84 (August 16): 1081–1086.

Sansing, R. 1998. The unrelated business income tax, cost allocation, and productive efficiency. *National Tax Journal* 51 (June): 291–302.

Schler, M. 1999. The implicit rationale for Section 512(b)(3). *Tax Notes* 84 (August 30): 1329–1330.

Sheppard, L. 1994. Aspirin and the ultimate tax shelter. *Tax Notes* 64 (July 25): 420–425.

Tenenbaum, J. 1996. Subsidiaries and related foundations: Maximizing the returns and minimizing the risks to your association. *The Exempt Organization Tax Review* 14 (July): 105–114.

Tirole, J. 1988. *The Theory of Industrial Organization.* Cambridge, MA: The MIT Press.

United States v. Robert A. Welch Foundation, 334 F2d 774; 5th Circuit (1964).

Yetman, R. 2000. Tax-motivated expense shifting by tax-exempt organizations. Working paper, The University of Iowa.

The Accounting Review
Vol. 76, No. 2
April 2001
pp. 263–274

Does Congruence between Audit Structure and Auditors' Locus of Control Affect Job Performance?

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ABSTRACT: This study examines how auditors' job performance is affected by the interaction between individual auditors' locus of control and the extent to which the employing audit firm uses a structured audit technology. We distributed an instrument that measures locus of control ("internal" vs. "external") and other key constructs to staff- and senior-level auditors from the two most structured and the two least structured (then) Big 6 accounting firms. Results indicate that supervisor-assessed job performance is positively associated with the "fit" between individual auditors' locus of control and the employing firm's audit structure. Specifically, auditors who have an internal locus of control perform at a higher level at unstructured than at structured firms, on average, while auditors who have an external locus of control perform better at structured than at unstructured firms. These findings are relevant to audit firms and individual auditors seeking a match between personal and firm characteristics, and to firms seeking to determine the potential impact of audit reengineering that may alter the level of structure in their audit approaches.

Keywords: *audit structure; locus of control; job performance; employee/work environment congruence.*

Data Availability: *Contact the authors.*

I. INTRODUCTION

Large audit firms are reengineering their audit approaches (Lemon et al. 2000). These reengineering efforts may affect important features of the work environment by changing the level of structure in the firms' audit processes (Bamber et al. 1989).

The authors thank Bill Felix, Jeff Schatzberg, Brian Shapiro, Steve Glover, Brian Spilker, Mark Taylor, Mark Zimbelman, two anonymous reviewers, and workshop participants at Washington State University, the AAA 2000 Globalization Conference, and the AAA 2000 Annual Meeting for their constructive comments and suggestions.

Submitted April 1999
Accepted October 2000

Research in psychology and organizational behavior indicates that characteristics of the work environment may, in turn, interact with employees' personal characteristics, and thereby affect individual job performance. This suggests that as firms reengineer their audit approaches, they should consider how audit structure affects auditors' job performance by interacting with their personal characteristics. Systematic differences in the levels of structure across large audit firms documented by prior accounting research (Cushing and Loebbecke 1986; Prawitt 1995) provide an opportunity to examine these issues. Accordingly, this study examines how auditors' job performance is affected by the congruence between firms' audit structure (an exogenous work-environment measure) and individual auditors' locus of control (an individual personality measure).

Individuals who have an internal locus of control (hereafter "internals") tend to believe that their actions directly influence outcomes. Accordingly, prior research suggests that internals tend to perform more effectively in environments that allow them more control over their actions. Individuals who have an external locus of control (hereafter "externals") tend to believe that outcomes are more attributable to outside forces than to their own actions. Thus, prior research suggests that externals generally perform better when more control is imposed on them (Spector 1982; Rotter 1990).

This study's results are consistent with our expectation that auditors perform better when there is an appropriate fit between firms' audit structure and individual auditors' locus of control. According to both supervisor- and self-assessed performance measures, internals at unstructured firms perform at higher levels than internals at structured firms. Conversely, externals at structured firms perform at higher levels than externals at unstructured firms. Further analysis indicates that these results are not attributable to any single firm in either structure category.

By documenting an interaction between firms' audit structure and individual auditors' locus of control, this study contributes to our understanding of how audit structure affects the human resources employed in audit firms. These results extend previous research that examines the main effects of audit structure on employees' behavior and performance. These findings are relevant to audit firms seeking to reengineer their audit approaches because these initiatives may affect their levels of audit structure and, thus, the way their audit approaches interact with their employees' personal characteristics. The results of this study are also relevant to both audit firms and individual auditors seeking to make hiring and employment decisions that maximize the likelihood of good performance.[1]

The next section of the paper develops our hypothesis concerning the interaction between audit structure and locus of control, and how this interaction affects job performance. Section III describes the development and distribution of the instrument, and provides descriptive statistics on the participating auditors. Section IV presents both the results of the hypothesis tests and supplementary results. Section V summarizes and suggests directions for future research.

II. HYPOTHESIS DEVELOPMENT

We expect the congruence between individual auditors' locus of control and their employing firms' audit structure to affect job performance. This section defines audit structure and locus of control, and develops the study's hypothesis.

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[1] A 1998 American Management Association survey found that about 50 percent of firms surveyed conduct some form of pre-employment psychological testing (up from 38 percent in the prior year) and that 25 percent administer personality tests to help assess the fit between the firm and potential hires (*USA Today* 1998). At least one of the Big 5 firms uses an online tool to screen prospective employees according to their personal characteristics.

Audit Structure

A structured audit approach relies on relatively comprehensive and integrated policies, procedures, and decision tools to transform judgments and evidence into an audit opinion. Audit structure is designed to help direct and control fieldwork and lower-level audit judgments (see Cushing and Loebbecke 1986; Bamber and Snowball 1988; Prawitt 1995).

The audit structure literature suggests that structure affects auditors' judgments and perceptions and, thus, plays an important role in human-resource issues (Bowrin 1998). Structure affects judgments and perceptions in that unstructured firms offer relatively little structured guidance or other mechanisms to encourage control and uniformity, whereas structured firms impose more specific guidance and control mechanisms to enhance consistency and uniformity (Cushing and Loebbecke 1986; Prawitt 1995). Prior research has found that auditors at structured firms perceive a higher level of formalization of rules and procedures, relatively less personal control and discretion over the specific procedures used, more similarity between one audit and the next, and more responsibility to use firm-provided materials and tools, than do auditors at unstructured firms (Bamber et al. 1989; Prawitt 1995). Prior studies have also examined the effects of audit structure on various human-resource issues, including auditor performance (e.g., Bamber and Snowball 1988; Morris and Nichols 1988; Williams and Dirsmith 1988; McDaniel 1990; Icerman and Hillison 1991; Bamber et al. 1993; Prawitt 1995; Prawitt et al. 2000). However, prior research has not investigated whether audit structure and individual auditor characteristics interact to affect auditor performance.

Locus of Control

Locus of control plays an important role in human performance in such accounting settings as participative budgeting (Brownell 1981, 1982; Frucot and Shearon 1991) and dealing with audit conflict (Tsui and Gul 1996). Locus of control also influences dysfunctional audit behavior, job satisfaction, organizational commitment, and turnover intentions (e.g., Reed et al. 1994; Donnelly et al. 2000).

One of the most frequently investigated personality constructs in the psychological and social sciences (e.g., see Rotter 1990; Strickland 1989), locus-of-control theory classifies individuals as either "internals" or "externals." Rotter (1990, 489) provides the following definition of locus of control:

> Internal versus external control refers to the degree to which persons expect that a reinforcement or an outcome of their behavior is contingent on their own behavior or personal characteristics versus the degree to which persons expect that the reinforcement or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable.

Prior research suggests that because internals tend to believe that their actions influence outcomes, they adapt better and perform more effectively in environments that allow them a greater degree of control over their own actions. Conversely, because externals tend to believe that outcomes are more a function of outside forces than of their own actions, they adapt better and perform more effectively when a greater degree of control is imposed on them (e.g., see Brownell 1981, 1982; Sandler et al. 1983; Hurrell and Murphy 1991; Dunk and Nouri 1998). However, it is important to note that in previous locus-of-control research in employment settings, the same subjects whose locus of control was being measured also assessed the work environment, leaving open the possibility that subjects' locus-of-control characteristics influenced their work-environment assessments.

The Effects of Audit Structure and Locus of Control on Job Performance

The current study examines whether audit structure affects the nature of the audit work environment such that the fit between structure and auditors' locus of control affects job performance. The rationale for our prediction is summarized as follows. Individuals classified as externals generally do not perceive a strong link between personal efforts and outcomes. They tend to believe that outcomes are determined by outside forces, such as luck, fate, or powerful others. Such individuals exhibit relatively ineffective task-oriented coping behaviors in ambiguous task settings (Anderson 1977). Thus, they may perform better when control is imposed on them and when they can simply carry out tasks or procedures decided upon by others (e.g., see Brownell 1981, 1982). Because structured firms prescribe more rules and step-by-step guidance, impose a relatively high degree of control, and allow less discretion over specific audit procedures, we expect structured firms' work environments to be more congruent with the characteristics of individuals with an external locus of control. Thus, we expect externals to perform at a higher level in structured than in unstructured firms.

On the other hand, individuals classified as internals generally perceive a relatively strong link between personal efforts and outcomes—they believe that their actions make a difference. Such individuals are more effective at manipulating ambiguous work environments to find the information they need to perform their jobs (Abdel-Halim 1980; Spector 1982), and may perform better in situations that allow them to exercise control and to take the actions they believe are appropriate under the circumstances (e.g., see Brownell 1981, 1982). Because auditors at unstructured firms experience a relatively high degree of control and can exercise more discretion over their choices of audit procedures, we expect unstructured firms' work environments to be more congruent with the characteristics of individuals with an internal locus of control. Consequently, we expect internals to perform at higher levels in unstructured than in structured firms.

The following hypothesis summarizes the prediction that job performance depends on the congruence between audit structure and individual auditors' locus of control.

> **H1:** Audit structure interacts with auditors' locus of control such that internals perform at higher levels at unstructured firms than at structured firms, and externals perform at higher levels at structured firms than at unstructured firms.

III. METHOD

Subjects and Instrument Development and Distribution

An instrument was distributed to staff- and senior-level auditors at four of the (then) Big 6 accounting firms to obtain data on locus of control and job performance. Table 1 presents descriptive statistics on participating auditors by structure category. Subject characteristics, including months of audit experience (30.8), number of audits worked (20.7), and minutes spent completing the questionnaire (28.3), do not differ significantly between structure categories. The data were collected approximately three years before the Big 6 merged into the Big 5, so the data were not affected by recent proposed or actual mergers, or by firms' recent audit reengineering.

Audit partners from several offices of each of the four firms served as our coordinators. Each package sent to a coordinator contained an instruction sheet and the agreed-upon number of instruments to be distributed. Each package included equal numbers of two differently ordered versions of the instrument (item ordering did not significantly affect auditors' responses). The coordinators distributed the instruments to staff and senior auditors in their offices. To preserve anonymity, participants returned the instruments directly to the researchers in the reply envelopes provided. We received instruments from 375 auditors in

TABLE 1

Descriptive Statistics for Subjects by Audit Structure Category

	Unstructured Audit Firms			*Structured Audit Firms*			*Overall*		
Subject Attribute	n^a	*Mean*	*Std. Dev.*	n^a	*Mean*	*Std. Dev.*	n^a	*Mean*	*Std. Dev.*
Audit experience (months)	184	31.2	17.8	190	30.5	15.3	374	30.8	16.5
Audit experience (number of audits)	173	20.6	16.1	183	20.7	12.2	356	20.7	14.2
Time to complete instrument (minutes)	182	27.7	8.5	189	28.9	9.3	371	28.3	8.9

[a] One hundred eighty-four auditors at unstructured firms and 191 auditors at structured firms responded; however, some respondents did not answer all of the questions. Each "n" reflects the number of auditors who answered each of the questions.

29 offices, for an overall response rate of 43 percent. Response rates from unstructured and structured firms were nearly identical (43 percent and 44 percent, respectively). There is no evidence of response bias based on a comparison of the means of key variables between early and late responders (Oppenheim 1966).

Dependent Variable

Job Performance

The dependent variable is based on subjects' actual supervisor-assessed performance evaluations on their two most recently completed audit engagements, as reported by the subjects. For the firms involved in this study, supervisors typically evaluate their subordinates' performance at the end of each engagement on which they work 40 hours or more. We averaged the performance evaluation scores from the two engagements to obtain a single score for each subject. For ease of interpretation, we inverted the measure so that higher numbers indicate better performance.

The participating firms use different scales to rate performance. Two of the firms (one structured and one unstructured) use four-point scales, where a score of "2" indicates "acceptable" performance. The other two firms (one structured and one unstructured) use five-point scales, where a score of "3" indicates "acceptable" performance. To control for differences in rating scales, we normalized the performance measure within firms ($X_n = \lfloor X_i - \bar{X} \rfloor / \sigma$). Normalizing within firms converts the measure to a common scale across firms and controls for differences in average rating levels. Normalizing also yields intuitively appealing results in that we can readily interpret performance scores for internals vs. externals as being above or below the mean.

Independent Variables

Locus of Control

Participants' locus of control is measured using Rotter's (1966) scale, which the majority of studies cited previously used. This scale includes 29 statement pairs, six of which are distracter items, presented in a forced-choice format. The measure is obtained by summing the number of external statements chosen from the 23 relevant internal/external statement pairs. Higher scores indicate stronger external tendencies (externals), and lower scores indicate stronger internal tendencies (internals). We split the locus-of-control measure at the median into two groups of approximately equal size.[2]

Audit Structure

Auditors from the two most structured and the two least structured of the former Big 6 firms participated in this study. This structure dichotomy is based on Cushing and Loebbecke's (1986) structure ratings, as confirmed by Prawitt (1995) for the same four firms participating in this study.

IV. RESULTS

Descriptive Statistics

Table 2 provides a summary of the research model and descriptive statistics for the independent variables and the (untransformed) dependent variable. For firms using a four-point scale, the observed range of the job performance measure is from 2.0 to 4.0. The mean performance measure for these two firms is 3.1, which is approximately one rating point better than "acceptable." For firms using a five-point scale, the observed range of the job performance measure is from 2.5 to 5.0. The mean performance measure for these two firms is 4.0, also one rating point better than "acceptable."

The observed locus-of-control measure ranges from 1 to 22, with a mean of 9.4. Because the locus-of-control scale has a possible range of 0 to 23, with a midpoint of 11.5, the observed mean indicates that subjects, on average, tend toward an internal locus of control. The mean locus-of-control score for subjects classified as internals is 6.6, and the mean score for externals is 12.8. Cronbach's alpha for locus of control in the current study is 0.74, which is consistent with prior studies (e.g., Arney [1988] and Donnelly et al. [2000]—0.76 and 0.83, respectively).

The Effects of Audit Structure and Locus of Control on Job Performance

Hypothesis 1 predicts that internals at unstructured firms will perform better than internals at structured firms, and that externals at structured firms will perform better than externals at unstructured firms. We test this prediction using an ANOVA with supervisor-assessed job performance as the dependent variable, and audit structure and locus of control as dichotomous independent variables.[3] As shown in Table 3, the locus-of-control/structure interaction term is significant ($p < 0.01$). When we analyze simple main effects we find that, consistent with H1, internals receive higher supervisor-assessed performance evaluations at unstructured firms than do internals at structured firms (0.23 vs. −0.08, $p = 0.02$, one-tailed). Conversely, and also consistent with H1, externals at structured firms receive higher performance evaluations than do externals at unstructured firms (0.10 vs. −0.23, $p = 0.02$, one-tailed). Results are qualitatively unchanged when we: (1) use a secondary performance measure based on subjects' responses to a 14-item, self-assessed performance

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[2] Thirty-seven participants have locus-of-control scores at the median. We classified these 37 participants as internals because this classification results in the most equal split possible and because the median score is below the mean score. Results are qualitatively identical when we exclude these 37 auditors from the analysis.

[3] When we repeat this and subsequent analyses using a regression model with locus of control as a continuous measure and structure as a 0,1 dummy variable, we obtain qualitatively identical results.

TABLE 2
Research Model and Descriptive Statistics for Operational Variables

Research Constructs	*Operational Measures*	*Possible (Observed) Range*	*Median (n^a)*	*Mean (Std. Dev.)*
Dependent Variable:				
Supervisor-Assessed Job Performance[b]	Average performance rating on two most recent audits			
	Firms with 4-point scales	1.0–4.0 (2.0–4.0)	3.0 (174)	3.1 (0.63)
	Firms with 5-point scales	1.0–5.0 (2.5–5.0)	4.0 (194)	4.0 (0.55)
Independent Variables:				
Locus of Control[c]	Number of external statements chosen from 23 internal/external statement pairs	0–23 (1–22)	9.0 (350)	9.4 (3.9)
Internal[c]	NA	0–9 (1–9)	7.0 (190)	6.6 (2.1)
External[c]	NA	10–23 (10–22)	12.0 (160)	12.8 (2.6)
Audit Structure	Subjects from two most and two least structured of the (former) Big 6 firms, based on Cushing and Loebbecke (1986), Prawitt (1995)	0/1 Variable	NA	NA

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[a] In total, 375 participants responded. Each "n" reflects the number of subjects who responded to all of the items pertaining to each of the individual measures.

[b] The range for the supervisor-assessed performance measure differs across firms—two of the firms (one structured and one unstructured) use four-point scales; the other two firms use five-point scales. The ranges shown in the table represent the average of subjects' actual supervisor-assessed performance evaluations on their two most recently completed audit engagements, as reported by the subjects. We inverted the performance scores; thus, higher scores indicate better performance. For analysis reported in the text and in subsequent tables, we normalized the performance measure within firms. The normalized performance measure for all subjects has an observed range of −1.53 to 3.47.

[c] The locus-of-control entry provides descriptive statistics for the full range of the locus-of-control variable. Higher scores indicate a more external locus of control. "Internal" and "external" provide descriptive statistics for the two levels of the dichotomous locus-of-control variable employed in subsequent analyses. Thirty-seven participants with locus-of-control scores at the median are classified as internals because this classification results in the most equal split possible, and because the median score is below the mean score.

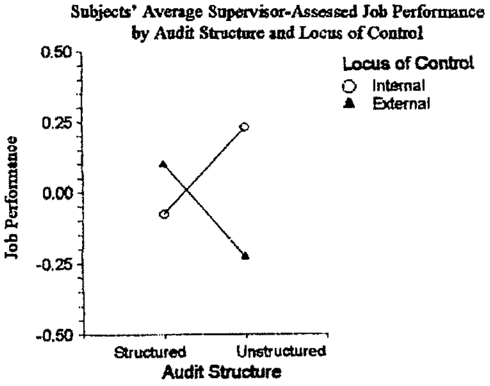
TABLE 3
The Effects of Audit Structure and Locus of Control on Supervisor-Assessed Job Performance

Panel A: Results of a 2 × 2 ANOVA of Audit Structure[a] *and Locus of Control*[b] *on Supervisor-Assessed Job Performance*[c]

Source of Variation	*df*	*SS*	*MS*	*F*	*p*
Audit structure	1	0.01	0.01	0.01	0.941
Locus of control	1	1.71	1.71	1.71	0.191
Locus of control × Audit structure	1	8.53	8.53	8.57	0.003
Error	340	338.83	1.00		
Total (adjusted)	344	349.10			

Panel B: Supervisor-Assessed Job Performance Mean Scores and Cell Sizes (Standard Errors)

Locus of Control	*Audit Structure*		
	Structured	*Unstructured*	*Totals*
Internal	−0.08	0.23	0.08
	92	94	186
	(0.10)	(0.10)	(0.07)
External	0.10	−0.23	−0.06
	80	78	158
	(0.11)	(0.11)	(0.08)
Totals	0.01	0.002	0.006
	172	172	344
	(0.08)	(0.08)	(NA)



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[a] Audit structure has two levels: (1) structured, for the subjects working for the two most structured of the former Big 6 firms and (2) unstructured, for the subjects working for the two least structured of the former Big 6 firms, as identified by prior research (Cushing and Loebbecke 1986; Prawitt 1995).

[b] Locus of control has two levels: (1) internal, for subjects whose locus-of-control scores were less than or equal to the median score, and (2) external, for subjects whose locus-of-control scores were higher than the median score.

[c] We calculated the supervisor-assessed job performance measure using the average of subjects' actual supervisor-assessed performance evaluations on their two most recently completed audit engagements, as reported by the subjects. We then standardized the measure using the standard-normal transformation within firms to control for scale differences and for differences in average performance levels across firms. Thus, the scores in the table represent the average number of standard deviations above or below the mean performance level. Higher scores correspond to higher performance levels, and vice versa.

measure adapted from Rebele and Michaels (1990), and (2) add respondent experience as a covariate.[4,5]

For descriptive purposes, we also analyzed simple main effects within structure categories. Results indicate that within unstructured firms, internals perform at a higher level than externals (0.23 vs. −0.23, $p < 0.01$, two-tailed). The performance difference between internals and externals within structured firms is not significant (−0.08 vs. 0.10, $p = 0.26$, two-tailed).[6] These results suggest that auditor locus of control plays a more significant role in unstructured firms than in structured firms—an issue that could be explored by future research.

To further investigate the locus-of-control/structure interaction effect on performance, we cross-tabulated the data to indicate the proportions of externals performing above and below the median within each firm type. We repeated the analysis for internals. As shown in Table 4, results indicate that performance is not independent of structure in either the external or the internal locus-of-control group (Fisher's exact $p = 0.06$ and 0.09, respectively). Panel A shows that of 69 externals with *above-median* performance assessments, 59 percent are in structured firms, and only 41 percent are in unstructured firms. By contrast, of 89 externals with *below-median* performance assessments, only 44 percent are in structured firms, but 56 percent are in unstructured firms. Panel B shows that of 87 internals with *above-median* performance assessments, 56 percent are in unstructured firms, but only 44 percent are in structured firms. By contrast, of 99 internals with *below-median* performance assessments, only 45 percent are in unstructured firms, but 55 percent are in structured firms.

Because the proportion of externals and internals in structured vs. unstructured firms is approximately 50/50, the data indicate that externals are approximately 46 percent more likely to be classified as above-median performers in structured firms than they are in unstructured firms ([41 − 28]/28), and internals are approximately 29 percent more likely to be classified as above-median performers in unstructured firms than they are in structured firms ([49 − 38]/38).

V. SUMMARY AND CONCLUSION

Prior accounting research has shown that audit structure affects the amount of formalization and control imposed on auditors. In turn, prior research in psychology and organizational behavior indicates that internals adapt more effectively than do externals to situations that allow the individual more control, and vice versa. Integrating these two streams of research, this study examines whether congruence between auditors' locus of control and the work environments they face affects auditors' job performance. We find that auditors'

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[4] We repeated the test for a structure by locus-of-control interaction four times, each time excluding one of the four participating firms from the analysis. In each of the four tests, the interaction was significant at $p < 0.05$ in the expected direction, indicating that the results are not driven by a single firm in either structure category.

[5] We regressed the continuous locus-of-control measure against respondent experience within each structure category. Within unstructured firms, respondents with more experience tend to be more internally oriented ($p < 0.09$). Within structured firms, the regression coefficient is not significant ($p = 0.35$). We repeated this regression using subjects found in the outer quartiles of the continuous locus-of-control measure. The results are similar to those using all subjects, except that the relationship in unstructured firms is stronger ($p < 0.04$). Future research could further examine how and why locus of control changes with experience in unstructured, but not in structured, firms.

[6] We also conducted a within-firm analysis, comparing supervisor-assessed performance between internals and externals within each of the four firms. The results support the primary analysis. Although we found no significant differences in performance across locus-of-control categories in one of the structured firms, in the other structured firm, externals had significantly higher average performance assessments than did internals. In each of the unstructured firms, internals had significantly higher performance assessments on average than did externals.

TABLE 4
The Effects of Audit Structure and Locus of Control on Above- and Below-Median Supervisor-Assessed Job Performance[a] (Supplemental Analysis)

Panel A: Cross-Tabulation for ***Externals***[b]*—Job Performance*[c] × *Audit Structure*[d]

Supervisor-Assessed Performance	*Audit Structure*		*Row Totals*
	Structured	*Unstructured*	
Below-median	39 (43.8%)	50 (56.2%)	89 (100%)
Above-median	41 (59.4%)	28 (40.6%)	69 (100%)
Column totals	80 (50.6%)	78 (49.4%)	158 (100%)

Fisher's Exact $p = 0.06$

Panel B: Cross-Tabulation for ***Internals***[b]*—Job Performance*[c] × *Audit Structure*[d]

Supervisor-Assessed Performance	*Audit Structure*		*Row Totals*
	Structured	*Unstructured*	
Below-median	54 (54.5%)	45 (45.5%)	99 (100%)
Above-median	38 (43.7%)	49 (56.3%)	87 (100%)
Column totals	92 (49.5%)	94 (50.5%)	186 (100%)

Fisher's Exact $p = 0.09$

[a] We calculated the supervisor-assessed job performance measure using the average of subjects' actual supervisor-assessed performance evaluations on their two most recently completed audit engagements, as reported by the subjects. We then standardized the measure using the standard-normal transformation within firms to control for scale differences and for differences in average performance levels across firms. Higher scores correspond to higher performance levels, and vice versa.

[b] The terms "external" and "internal" refer to the subjects' locus of control. Locus of control has two levels: (1) internal, for subjects whose locus-of-control scores were less than or equal to the median score, and (2) external, for subjects whose locus-of-control scores were higher than the median score.

[c] One hundred fifty-six subjects providing responses to all relevant questions were classified above the performance median, and 188 were classified below the median. Because the performance measure is not continuous, a 50/50 split is not possible. However, the split does cleanly divide the subject group at the mean.

[d] Audit structure has two levels: (1) structured, for subjects working for the two most structured of the former Big 6 firms and (2) unstructured, for subjects working for the two least structured of the former Big 6 firms, as identified by prior research (Cushing and Loebbecke 1986; Prawitt 1995).

performance levels depend on the fit between audit structure and locus of control. Specifically, internals perform at higher levels at unstructured firms than at structured firms, and externals perform at higher levels at structured firms than at unstructured firms.[7]

Researchers investigating individual/environment congruence have long called for exogenous measures of the work environment to rule out the potential alternative explanation that subjects' assessments of the work environment are affected by, and are thus correlated with, their personal characteristics (e.g., Pervin 1968). This is the first study to demonstrate the moderating effects of locus of control using an exogenous, firm-level measure of the work environment, rather than an endogenous, subject-assessed measure.

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[7] As indicated above, subjects reported their supervisor-assessed performance evaluations in response to the research instrument. Our inability to directly observe the evaluations represents a potential limitation in interpreting our findings. However, the interactive nature of our results reduces the plausibility of possible alternative explanations.

This study's results are relevant to accounting firms seeking to improve their individual hiring decisions, and to individual auditors seeking an environment in which they can maximize the likelihood of good performance. These results may also help inform audit firms' reengineering efforts, because these initiatives may affect their levels of audit structure and thus the way their audit approaches interact with their employees' personal characteristics.

One might interpret this study as lending support to psychology-based screening in hiring decisions, but on the other hand, hiring auditors who do not fit the firm's work environment could add to the firm's dynamism by countering the potentially implosive force of insulated organizational culture (e.g., Mintzberg 1989). Given that human resources represent audit firms' most significant input, the ultimate effect of including or excluding workers who do not fit the particular firm's work environment is important for both practice and research.

Although the evidence is clear that auditors at structured and unstructured firms experience significantly different work environments, this study examines a limited number of work-environment characteristics. Future research could develop and test expectations regarding other differences in work environments related to firm structure (e.g., how structure affects auditors' work environments at different levels of responsibility). Another important question for future research is why the impact of an appropriate fit between structure and locus of control is more pronounced in unstructured than in structured firms.

REFERENCES

Abdel-Halim, A. A. 1980. Effects of person-job compatibility on managerial reactions to role ambiguity. *Organizational Behavior and Human Performance* 26: 193–211.

Anderson, C. R. 1977. Locus of control, coping behaviors, and performance in a stress setting: A longitudinal study. *Journal of Applied Psychology* 62 (August): 446–451.

Arney, L. K. 1988. Effects of personality-environment fit on job stress. *Educational and Psychological Research* 8: 1–18.

Bamber, E. M., and D. Snowball. 1988. An experimental study of the effects of audit structure in uncertain task environments. *The Accounting Review* 63 (July): 490–504.

———, ———, and R. M. Tubbs. 1989. Audit structure and its relation to role conflict and role ambiguity: An empirical investigation. *The Accounting Review* 64 (April): 285–299.

———, L. S. Bamber, and M. P. Schoderbek. 1993. Audit structure and other determinants of audit report lag: An empirical analysis. *Auditing: A Journal of Practice & Theory* 12 (Spring): 1–23.

Bowrin, A. R. 1998. Review and synthesis of audit structure literature. *Journal of Accounting Literature* 17: 40–71.

Brownell, P. 1981. Participation in budgeting, locus of control and organizational effectiveness. *The Accounting Review* 56 (October): 844–860.

———. 1982. A field study examination of budgetary participation and locus of control. *The Accounting Review* 57 (October): 766–777.

Cushing, B. E., and J. K. Loebbecke. 1986. *Comparison of Audit Methodologies of Large Accounting Firms.* Accounting Research Study No. 26. Sarasota, FL: American Accounting Association.

Donnelly, D. P., J. J. Quirin, and D. O'Bryan. 2000. Antecedents and consequences of dysfunctional audit behavior: The roles of locus of control, performance, and turnover intentions. Working paper, Kansas State University, Manhattan, KS.

Dunk, A. S., and H. Nouri. 1998. Antecedents of budgetary slack: A literature review and synthesis. *Journal of Accounting Literature* 17: 72–96.

Frucot, V., and W. T. Shearon. 1991. Budgetary participation, locus of control, and Mexican managerial performance and job satisfaction. *The Accounting Review* 66 (January): 80–99.

Hurrell, J. J., Jr., and L. R. Murphy. 1991. Locus of control, job demands, and health. In *Personality and Stress: Individual Differences in the Stress Process*, edited by C. L. Cooper, and R. Payne. Chichester, U.K.: John Wiley & Sons.

Iceman, R. C., and W. A. Hillison. 1991. Disposition of audit-detected errors: Some evidence on evaluative materiality. *Auditing: A Journal of Practice & Theory* 10 (Spring): 22–34.

Lemon, W. M., K. W. Tatum, and W. S. Turley. 2000. *Developments in the Audit Methodologies of Large Accounting Firms.* Hertford, U.K.: Stephen Austin & Sons Ltd.

McDaniel, L. S. 1990. The effects of time pressure and audit program structure on audit performance. *Journal of Accounting Research* 28 (Autumn): 267–285.

Mintzberg, H. 1989. *Mintzberg on Management: Inside Our Strange World of Organizations.* New York, NY: The Free Press.

Morris, M. H., and W. D. Nichols. 1988. Consistency exceptions: Materiality judgments and audit firm structure. *The Accounting Review* 63 (April): 237–254.

Oppenheim, A. N. 1966. *Questionnaire Design and Attitude Measurement.* New York, NY: Basic Books.

Pervin, L. A. 1968. Performance and satisfaction as a function of individual-environment fit. *Psychological Bulletin* 69: 56–68.

Prawitt, D. F. 1995. Staffing assignments for judgment-oriented audit tasks: The effects of structured audit technology and environment. *The Accounting Review* 70 (July): 443–465.

———, W. L. Felix, Jr., and B. C. Spilker. 2000. The effects of structure and environment on human resource allocation in auditing. Working paper, Brigham Young University, Provo, UT.

Rebele, J. E., and R. E. Michaels. 1990. Independent auditors' role stress: Antecedent, outcome, and moderating variables. *Behavioral Research in Accounting* 2: 124–153.

Reed, S., S. Kratchman, and R. Strawser. 1994. Job satisfaction, organizational commitment, and turnover intentions of United States accountants: The impact of locus of control and gender. *Accounting, Auditing & Accountability Journal* 7: 31–58.

Rotter, J. B. 1966. Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs* 80 (1): 1–28.

———. 1990. Internal versus external control of reinforcement. *American Psychologist* 45 (April): 489–493.

Sandler, I., F. Reese, L. Spencer, and P. Harpin. 1983. Person x environment interaction and locus of control: Laboratory, therapy, and classroom studies. In *Research with the Locus of Control Construct*, Vol. 2, edited by H. M. Lefcourt. New York, NY: Academic Press.

Spector, P. E. 1982. Behavior in organizations as a function of employee's locus of control. *Psychological Bulletin* 91: 482–497.

Strickland, B. R. 1989. Internal-external control expectancies. *American Psychologist* 44 (January): 1–12.

Tsui, J. S. L., and F. A. Gul 1996. Auditors' behaviour in an audit conflict situation: A research note on the role of locus of control and ethical reasoning. *Accounting, Organizations and Society* 21 (January): 41–51.

USA Today. 1998. More job seekers have the profile of a liar. (July 15): 4b.

Williams, D. D., and M. W. Dirsmith. 1988. The effects of audit technology on auditor efficiency: Auditing and the timeliness of client earnings announcements. *Accounting, Organizations and Society* 13: 487–508.

THE ACCOUNTING REVIEW
Vol. 76, No. 2
April 2001
pp. 275–284

Accounting Scholarship: What Is Uniquely Ours?

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I. INTRODUCTION

This lecture explores what I submit is the relatively unchanging and unique-to-us core of accounting scholarship. I believe that we cannot depend on our history, the SEC, or tenure to guarantee our future prosperity as accounting professors. We must have value-adding knowledge that others cannot create and transfer better than we can. By focusing on our core competency, I hope to provide some insights into what is uniquely ours as accounting scholars (and has been for the past 40 years), what we must develop and maintain, and what we can release as unnecessary for our long-term prosperity.

I identify three elements that are essential to the value of accounting and accounting scholarship: (1) relevance of a set of standardized business measurements for a wide variety of decisions made by diverse decision makers, (2) precision or care in applying the measurement criteria, and (3) trustworthiness of measurement displays. The three elements are operationalized through four sequential activities or observables: (a) choice of a standardized business measurement structure, (b) application of the structure to particular entities, (c) customization of resulting information for particular decisions, and (d) resulting decisions and outcomes.

Accounting professionals typically perform the first two activities, accountants and others perform the third; nonaccountants typically make the decisions and these decisions interact with Nature to determine the outcomes. Accounting scholars study all three elements, all four activities, and their interrelations, but I believe that choice of a standardized ("one-size-fits-all") measurement structure and understanding of the consequences of that choice is central to accounting scholarship.

This lecture is organized into three parts, beginning with a conceptual model of what is uniquely ours as accounting scholars. Second is an historical review of changes in the accounting environment from 1960 to 2000, and significant intervening events relating to information technology, regulation, and business practices. I end by discussing some implications for us as accounting scholars.

This article is based on a Presidential Lecture presented at the American Accounting Association's Annual Meeting on August 15, 2000, Philadelphia, PA. I thank President Jan R. Williams for the opportunity to deliver the American Accounting Association's second Presidential Lecture, and Research Director Joel S. Demski and the Research Committee for nominating me. I also thank Zoe-Vonna Palmrose, Linda McDaniel, Linda Bamber, and participants in Lisa Koonce's Behavioral Brown Bag workshop at The University of Texas for their helpful suggestions.

Editor's Note: The Executive Committee of the American Accounting Association has recommended the commission of a series of Presidential Research Lectures, to be delivered at annual meetings of the Association. To encourage broad dissemination, the Committee has requested that *The Accounting Review* publish this lecture given at the 2000 American Accounting Association Annual Meeting in Philadelphia, PA.

II. A CONCEPTUAL MODEL OF WHAT IS UNIQUELY OURS

The Elliott Committee's definition of assurance services includes most services that CPA firms offer, most of what financial, management, and tax-planning accountants (and auditors) do, and it covers much of the unique domain of accounting scholarship. According to the Elliott Committee:

> Assurance services are independent professional services that improve the quality of information, or its context, for decision makers. (AICPA 1996)

The defined services are *professional* (they apply a body of knowledge and judgment) and *independent* (the assurance professional has no substantial interest in the information other than its quality). The *quality* of information is comprised of its relevance for a particular decision and decision maker and its reliability (care in or precision of its preparation and trustworthiness of its display), while information *context* denotes factors surrounding a decision including the knowledge and abilities of the decision maker and the decision-maker's utility function.

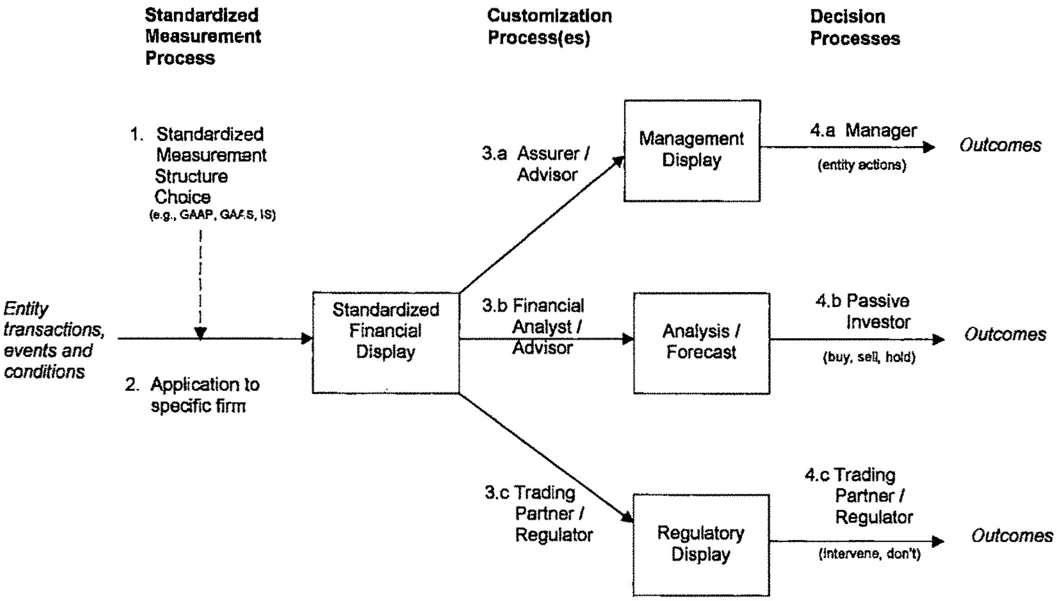
Accounting information is one important type of information for decision makers, and almost all accounting professionals are engaged in assurance services, broadly defined. Some accountants improve the quality of information by developing standardized accounting (financial measurement) criteria to be applied across multiple entities and across time to yield relevant information for decision makers (hence, "one size fits all"). Other accountants apply the criteria and remaining structure to particular transactions, events, and conditions of a specific entity, and still other accountants (independent auditors) verify that the methods have been applied within specified limits. Finally, many accountants and others "customize" or adapt standardized financial measurements and other information into a more relevant form for a particular decision and decision maker. These three assurance activities—developing standardized business measurement criteria, applying the criteria to specific entities, and customizing the resulting information—appear as arrows in Figure 1 and comprise three of the four elements of accounting scholarship.

Accounting professionals employed within and outside an entity are typically considered "independent" to the degree that the information they prepare, audit, or customize does not measure their own performance or define their own wealth. Thus, their primary concern is not with whether the accounting numbers are higher or lower, but whether the information is relevant and reliable. A decision-maker's beliefs about the accounting professional's independence enhance the decision-maker's perception of the relevance, care in preparation, and trustworthiness of standardized and customized information displays.

Management, a primary decision maker and customer of CPA firms, needs standardized accounting and assurance services to: *inform itself* about the entity and how it might be better operated; credibly *inform others* (sources of capital and trading partners) about the entity to lower the costs of capital, acquisition, production, distribution and sales; and *comply* with laws, regulations or contracts that specify disclosure (and independent verification) of certain entity data. Thus, high-quality information (and accounting assurance services) has great value for management for both internal and external uses.

In the U.S., the standardized financial measurement structure (arrow 1 in Figure 1) is defined by three sets of standards: generally accepted accounting principles (GAAP), generally accepted auditing standards (GAAS), and independence standards (IS). GAAP is intended to yield measurements that will provide decision-relevant information for investors, and GAAS and IS are intended to increase perceived reliability of information by specifying the allowable risk of material misstatement of standardized information, and by proscribing certain auditor activities and relationships that regulators believe might impair actual or

FIGURE 1
The Domain of Accounting Scholarship


Standardized Measurement Process
Customization Process(es)
Decision Processes
1. Standardized Measurement Structure Choice (e.g., GAAP, GAAS, IS)
Entity transactions, events and conditions
2. Application to specific firm
Standardized Financial Display
3.a Assurer / Advisor
3.b Financial Analyst / Advisor
3.c Trading Partner / Regulator
Management Display
Analysis / Forecast
Regulatory Display
4.a Manager (entity actions)
4.b Passive Investor (buy, sell, hold)
4.c Trading Partner / Regulator (intervene, don't)
Outcomes
Outcomes
Outcomes

perceived trustworthiness of information. The structure provides a common denominator of measurements all public companies (and others by contract) must provide. This financial-measurement structure defines a set of measurements that have enhanced value because management does not prescribe the structure, and the measurements are comparable within an entity, across entities, and over time.

The accounting community developed and substantively controls the standardized financial-measurement structure. Accountants serving on the Financial Accounting Standards Board control the GAAP framework. They can make GAAP-based numbers more valuable for direct and customized use by individual decision makers and society as a whole. The more relevant (and comprehensive) the GAAP-based measurements, the better off accountants (and accounting scholars) can become. This measurement criteria core is vital to the interests of accounting professors as well as practitioners.

The accounting community also controls GAAS and IS, which are intended to enhance a decision-maker's perceptions of the precision, objectivity, and trustworthiness of GAAP-based measurements prepared by a self-interested manager. Choice of the GAAS and IS parts of the structure (arrow 1 in Figure 1) involves costs and benefits of auditing, and the costs and benefits of regulation across CPA firms vs. private incentives for establishing and maintaining a reputation for competence and integrity as an individual CPA firm.

Most users of accounting information who are external to the entity cannot choose the measurement criteria or the auditor. Yet, these external users must believe the measurements are decision-relevant, have confidence in the care and trustworthiness of the certifying auditor's work to verify that the entity has properly and carefully applied GAAP, and confidence that the resulting display is trustworthy. Since external users such as investors, creditors, and trading partners can affect the terms of trade, management has an incentive to choose relevant criteria and an auditor with a good reputation who certifies the measurement-structure's application and display (arrow 2 in Figure 1). Thus, standards setters, management, and auditors have an interest in the quality of standardized business measurement structure and its application that provides information for decision makers.

Decision makers need future-oriented customization of standardized business measurement displays to adapt them to a particular context. Customization activities (arrows 3a, 3b, and 3c in Figure 1) are not mandated, and accountants have no monopoly over their application. Rather, accountants must use their knowledge of measurement structure and other knowledge to compete with nonprofessionals based on the value of their customizations.

Customization that improves the quality of information for management's decision making (arrow 3a) is within the domain of internal control, management accounting, and tax planning within the firm. External advisors such as CPAs also provide customization in the form of transaction- and process-design advice, planning advice, risk assessments, and other advisory and investigative assurance services. Other parties external to the firm provide at least two other types of customization. Financial analysts and investment advisors (arrow 3b) combine information from accounting displays with other information to produce forecasts of earnings and other information that passive investors use in deciding whether to buy, sell, or hold a security.

Trading partners may offer better terms of trade if GAAP-based numbers and other information are provided for coordination and process intervention decisions. Similarly, outsiders charged with oversight or corporate governance also use GAAP-based accounting displays in conjunction with various regulatory and contractual rules to make intervention decisions on behalf of stockholders or society (arrow 3c). Thus, various decision makers customize standardized accounting displays for specific types of decisions. The value of customizations depends on GAAP, its application, and its display by the specific entities.

Figure 1 also includes the decision processes of managers, passive investors, and others and decision outcomes (arrows 4a, 4b, 4c). It is important to recognize that managers' action choices and resulting outcomes of future transactions, events, and conditions are beyond the scope of assurance services, internal control, and management accounting and tax planning. However, scholarly accounting includes them along with structure choice, application of the structure to particular firms, and customization of standardized displays.

I define the domain of accounting scholarship as the *knowledge of the individual and aggregate effects of alternative standardized business measurement and reporting structures*. Under this definition, selection of a standardized measurement structure (e.g., GAAP, GAAS, and IS as depicted by arrow 1 of Figure 1, as well as other internal or special-purpose structures) is central to accounting scholarship. In addition to the effects of applying alternative standardized measurement structures to individual firms, accounting scholars also study the aggregate or macro effects of standardized measurement structure choice, including corporate governance. While we will not dwell on aggregate or social value, compare the aggregate outcomes from transparent systems of GAAP-based public reporting such as in the U.S. against outcomes in other countries that do not have such transparent reporting structures. The widespread business failures in Japan and other parts of Asia in 1997 and 1998 might have been less serious with earlier warnings mandated for disclosure to minority shareholders and outsiders by a GAAP-based reporting structure as exists in the United States. The same can be said for several large German firms over the last five years. Public disclosure of standardized information relevant for investor customization creates social value by allowing managers, investors, regulators, and society as a whole to direct capital to its most productive uses.

III. HISTORICAL REVIEW: 1960–2000

Information Relevance

In 1960, standardized mandated accounting comprised the only comprehensive systematic measurements available within a firm and across firms. A firm's managers used GAAP-based numerical accounting measurements of the firm's basic exchange transactions to make internal business decisions, and external parties also used GAAP-based numerical measurements (point estimates) to assess the firm's comparative performance and prospects. Public disclosure of standardized accounting reports following GAAP was required by law, and independent auditors were required to audit these numbers following GAAS and applicable independence rules.

In those days, GAAP was determined through general acceptance by expert accountants. That is, GAAP depended upon what other competent professionals would say is the acceptable accounting for a particular transaction or event. As a student nearing graduation in the early 1960s, I came to realize that I was almost an accountant because, given a novel situation, I could use analogical reasoning to determine an accounting measure that most qualified accounting experts would view as best or at least "acceptable."

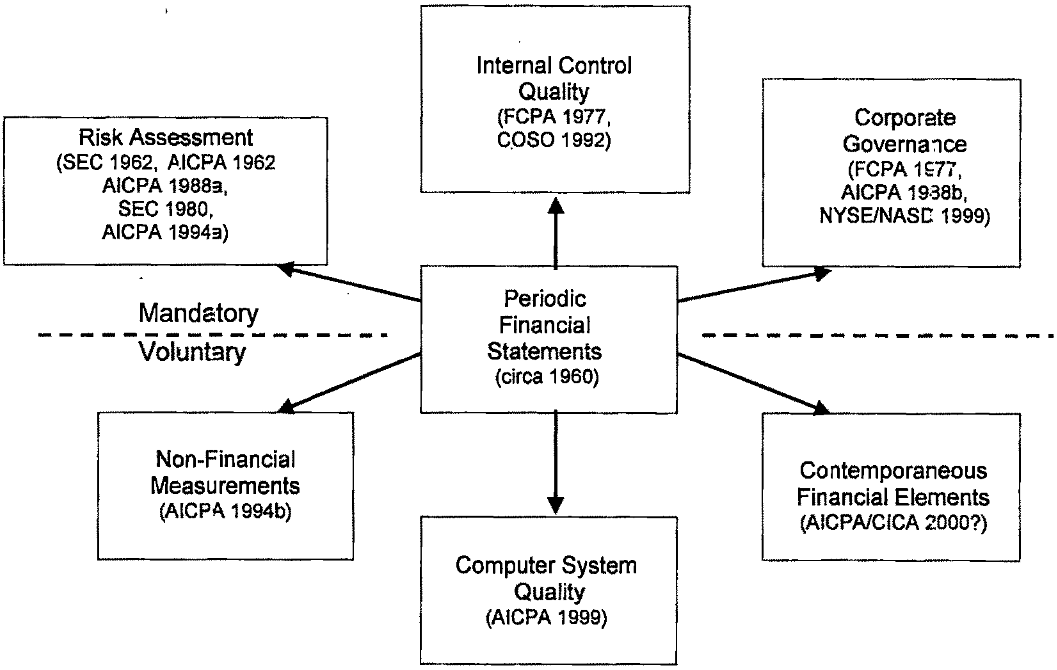
There have been several major expansions of the scope of standardized financial measurement and disclosure since 1960. Some of these are mandated reports by management or by the external auditor, and others are voluntary. Expansions of both types augment the value of accounting, and reflect the reputation of accountants and CPAs as trusted measurement experts. Figure 2 summarizes these changes in measurement.

Figure 2 begins with periodic GAAP financial statements, circa 1960, and expands in six directions GAAP's point measurements of financial variables. Chronologically, the first expansion of scope required disclosure of various entity risk factors beginning in 1962 and continuing throughout the 1990s (e.g., SEC 1962, 1980; AICPA 1962, 1988a, 1994a). These disclosures include the risk of material loss contingencies, risk of sudden business failure, and measurement and disclosure of risks and uncertainties the business faces. These "second, third, and fourth" statistical-moment measurements are increasingly important to decision makers in a rapidly changing business environment characterized by supply-chain integration and other alliances that blur traditional entity boundaries. The SEC and AICPA now require registrants to publicly report some of these risks, and the Auditing Standards Board (ASB) requires CPAs to audit them. Regulators viewed accountants and auditors as having the competence and trustworthiness to make and evaluate these important risk assessments.

Similarly, in the late 1970s Congress addressed the importance of internal controls in protecting investors and their confidence in securities markets. The government adopted into federal law the existing audit guidance on internal control, and required external auditors to report to audit committees material weaknesses in firms' internal controls over financial reporting (FCPA 1977). Thus, process assurance is at least implicit in mandated public reporting (AICPA 1988b; COSO 1992; NYSE/NASD 1999), and explicit for certain financial institutions. Again, Congress assigned this duty to CPAs because of their expertise in internal control, and investors' trust in their competence and integrity. Finally, when regulators focused on controlling management fraud, they assigned to auditors the responsibility to consider fraud, including fraud by management (FCPA 1977; AICPA 1988b).

In addition to these mandatory disclosures, three other types of voluntary disclosure criteria are evolving, and each may become part of future structures. One is standardized nonfinancial measurements that articulate with standardized financial measurements. For example, the Jenkins Committee (AICPA 1994b) suggests that firms develop standardized nonfinancial measurements that articulate with financial measurements to provide additional

FIGURE 2
Standardized Reporting Criteria at 2000


Internal Control Quality (FCPA 1977, COSO 1992)
Risk Assessment (SEC 1962, AICPA 1962 AICPA 1988a, SEC 1980, AICPA 1994a)
Corporate Governance (FCPA 1977, AICPA 1988b, NYSE/NASD 1999)
Mandatory
Voluntary
Periodic Financial Statements (circa 1960)
Non-Financial Measurements (AICPA 1994b)
Contemporaneous Financial Elements (AICPA/CICA 2000?)
Computer System Quality (AICPA 1999)

insight into the entity's affairs. One can envision a world in which an expanded and articulated set of nonfinancial measurements adds value to basic financial measurements across an economy (thus adding to the value of being an accountant, auditor, or accounting scholar). However, to date, the value to individual firms of reporting these measurements has generally fallen short of their cost of preparation and unilateral disclosure. Agreement among preparers, auditors, and users of information on a set of standardized criteria may be necessary for value to obtain.

A second area of voluntary expansion of measurement criteria is computer system quality. The AICPA and the Canadian Institute of Chartered Accountants (CICA) have developed and branded a new attestation service (denoted SysTrust, AICPA 1999) to certify that an entity's computer system design and operations comply with certain criteria. This process assurance may instill in outsiders enough confidence in an entity's computer system to encourage outsourcing of noncore processes that depend on exchange of high-quality information with trading partners.

Finally, the AICPA and CICA are developing mechanisms for continuously certifying at least some accounting numbers flowing from standardized accounting systems and made available on demand from those outside the entity (see *PAR* 2000). Continuous certification will increase users' confidence in real-time accounting displays, which, in turn, will change the costs and benefits of annual audits of financial statements reporting the same information.

Information Reliability (Precision and Trustworthiness)

In 1960, accounting data were manually processed transaction by transaction, and auditing focused on detecting and correcting misstatements in individual transactions and the resulting balances. Auditors relied primarily on tests of details, observing and confirming tangible assets, examining documentary evidence, and recalculating allocations such as depreciation. Clients' manual information processing limited auditors' reliance on internal controls, and the lack of reliable and timely external information limited auditors' analyses of aggregated transactions as a source of audit evidence.

Today, internal control, transactions processing, and much of detailed auditing have been automated and are now inexpensive. Computer systems that sense transaction data also embed controls that prevent misstatements, reducing the likelihood of subsequent misstatement. Automation and data availability from related processing streams within the entity and from outside sources makes audit analysis of aggregated items operational and economical. In short, an automated process applied to all transactions is inherently more reliable and more valuable than a manual system.

As to decision-makers' perceptions of the trustworthiness of audited financial displays (related to auditor independence), in 1960 many small CPA firms audited public companies, and their clients demanded a relatively small volume of nonaudit CPA services. The profession promoted perceptions of independence across the large number of audit firms by proscribing certain actions and relationships with clients. In particular, auditors were not to have direct or material indirect financial interest in clients, nor to make business decisions for clients. More recently auditors were proscribed from accepting contingent fees (compensation based on outcomes of an audit or success of a transaction).

Today, a few large CPA firms conduct virtually all audits of major public companies, and clients purchase many services from their CPAs. As we all know, there is considerable conflict and confusion over how best to maintain outsiders' perceptions of the trustworthiness of auditors and audit firms. The issues are sometimes subtle and involve arguments about whether "independence" should apply to the CPA firm or the individual auditor, and whether independence relates to the client or to the information. For example, some question whether a CPA who advises the client on designing a transaction to meet a particular GAAP treatment has an interest in certifying compliance with GAAP as the client's independent auditor. The SEC allows the auditor to provide such advice for a single (very large) transaction, but has concerns about CPA firm computer-systems experts advising audit clients on their accounting systems for processing many small transactions.

IV. IMPLICATIONS FOR OUR FUTURE

Changes in the measurement environment have several important implications for accounting scholarship. First, accounting estimates, risk assessments, and judgments are more important today than they were in 1960. Accountants are providing these estimates and assessments, yet we know relatively little about how best to estimate uncertain amounts and how best to measure and report risk of adverse future events. Furthermore, many universities do not provide adequate training that allows students to develop these professional judgment and decision-making skills.

Second, we need to consider updating the accounting model to better measure intangible and market-based assets, and to measure and report on entities with "cloudy boundaries." That is, how should we account for an entity whose "inventory" is owned by another party and whose "fixed assets" are owned by a trading partner?

Third, there are several untested but very important questions for macro-level scholarly accounting research. Except for information in GAAP-based financial statements, the accounting profession does not have a mandate from the government, and competition to measure and interpret financial and nonfinancial performance measurements is increasing. To succeed, accountants must be competitive in these markets, adding more value than cost for their customers. What are the economics of accountants competing with other suppliers of financial and other information in developing and maintaining a set of nonmandated measurement criteria? Relatedly, what are the economics of a system of mandated periodic reporting of audited business information for all entities? Can a GAAP-based system compete with other financial-measurement criteria without a mandate? Finally, how can accountants best compete with nonaccountants for advisory services?

We all know that information technology allows firms to automate business and information processes. Information technology also typically allows nonaccountants such as production workers and sales personnel to directly enter transaction-based accounting data. It lowers information cost to allow accountants and others to measure nonfinancial items, to develop alternative financial measures, and to automate controls over information processing. These changes shift the audit's focus from detecting and correcting to preventing misstatements. Information technology also allows auditors to rely on control evaluations and analyses of aggregated processing results, rather than detailed examination of individual transactions. In addition and because processes are more important, auditors must develop audit and reporting skills to certify management process assertions. Finally, changing technology implies that accountants must understand information technology to be effective and efficient advisors and auditors.

Collectively, these changes shift personnel demand away from beginning accounting and audit workers who apply and audit GAAP, and toward those who develop comprehensive and automated preventive controls and processing systems. There is also a shift toward knowledge workers who can interpret the information in standardized financial measurements. There is also an increased demand for managers and other decision makers who know how to use accounting and control information for decision making. I believe that as accounting educators, we should redirect our teaching toward what we have to offer to information- and control-systems designers, to customizers, and to management and other decision makers.

Accounting scholarship as I defined it is broader than the choice of particular numbers for a specific firm and conditions. Rather, it attempts to understand the costs and benefits of standardized measurement methods that we apply to all firms in all possible conditions over a period of time. This coverage includes individuals making particular decisions, but also considers such decisions in the aggregate. Accounting scholars attempt to understand how standardized measurement systems add value for the decision maker(s). This aspect of our existence has not changed from 1960 through today, and if it is our core competency, it will not change through 2010.

If we are to prosper as accounting scholars, then we must address the value of standardized business measurement structures for decision makers, both individually and in the aggregate. Information technology allows accountants and others to economically prepare many displays, including standardized financial measurement. But to what extent is the standardized accounting component valuable? Does standardized measurement add value? If so, then why? On what does its value depend? How do alternative measurements or structures affect behavior? Does a valuable set of standardized financial and nonfinancial data definitions exist? Accounting scholarship can address all of these questions, and I submit that the answers to these questions are highly important (and valuable) for individual decision makers and for society as a whole.

Note that I did not say "official accounting," or accounting under rules prescribed by government authorities. Government authorities can and do require standardized measurements, but accounting scholarship does not necessarily depend upon government mandates for value. Stated another way, if we assume that government mandates guarantee accounting scholars a job, then we make a serious error—changes brought about by information technology can change the value of even mandated measurements, and may eventually lead to withdrawal of the mandate.

Knowledge about alternative standardized business measurement structures is our core process or core competency. We have it, and no one else does. Our scholarly competitors in the business school may know more about decision analysis, finance, information technology, or strategy. However, they do not know how standardized measurements applied to all firms over time affect decision making and outcomes individually and in the aggregate.

That is it. That is what we share—our knowledge about the costs and benefits of standardized business measurement structures for individual decision makers and in the aggregate. Our value lies in understanding how changes in these three basic parameters: standardized measurement criteria, precision of application, and trustworthiness of display have value in decision making and in control of business organizations.

These elements of the value of information apply to external reporting, and explain some of our major institutions. They also apply to internal information management uses for day-to-day decisions and lead to various contracts to assure the relevance, care, and trustworthiness of information for outsiders. The same concepts apply to audit committee members in evaluating reports on the firm and its processes, and to government regulators.

If decision makers, individually and in the aggregate, believe that standardized measurements are not decision-relevant, sufficiently precise, or trustworthy, then we lose. We must continually revisit the measurement criteria (maybe even inventing new measures), the role of technology in maintaining and improving precision, and various means of maintaining the credibility of the standardized business reporting process. Our research is needed to improve the quality of information for individual and collective decision making about alternative standardized measurement structures. We cannot do it without help from accounting and business practitioners, and they cannot fully succeed without our help in conducting relevant, careful, and trustworthy research.

REFERENCES

American Institute of Certified Public Accountants (AICPA). 1962. *Qualifications and Disclaimers.* Statement on Auditing Procedure No. 32. New York, NY: AICPA.

———. 1988a. *The Auditor's Consideration of an Entity's Ability to Continue as a Going Concern.* Statement on Auditing Standards No. 59. New York, NY: AICPA.

———. 1988b. *Communications with Audit Committees.* Statement on Auditing Standards No. 61. New York, NY: AICPA.

———. 1994a. *Disclosure of Certain Significant Risks and Uncertainties.* Statement of Position No. 94-6. New York, NY: AICPA.

———. 1994b. *Improving Business Reporting—A Customer Focus: Meeting the Information Needs of Investors and Creditors.* New York, NY: AICPA.

———. 1996. *Report of the Special Committee on Assurance Services.* Available at: http://www.aicpa.org/assurance/index.html.

———. 1999. CPA SysTrust^{sm} Service—A New Assurance Service on System Reliability. Available at: http://www.aicpa.org/assurance/systrust/index.htm.

Committee of Sponsoring Organizations of the Treadway Commission (COSO). 1992. *Internal Control—Integrated Framework.* Harborside, NJ: AICPA.

Foreign Corrupt Practices (FCPA). 1977. Act of 1977. Pub. L. No. 95-213, tit. I, 91 Stat.1494. Washington, D.C.: Government Printing Office.

New York Stock Exchange and National Association of Securities Dealers (NYSE/NASD). 1999. *Report and Recommendations of the Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees*. New York, NY: NYSE/NASD.

Public Accounting Report (*PAR*). 2000. Profession to overhaul audit technology. (July 15): 1, 5.

Securities and Exchange Commission (SEC).1962. *Certification of Financial Statements.* Accounting Series Release No. 90. Washington, D. C.: SEC.

———. 1980. *Management's Discussion and Analysis of Financial Condition and Results of Operations.* Securities Act Release No. 6231. Regulation S-K (item 303). Washington, D.C.: SEC.

THE ACCOUNTING REVIEW
Vol. 76, No. 2
April 2001
pp. 285–290

BOOK REVIEWS

Jane L. Reimers, Editor

Editor's Note: This is a special book review section featuring a commentary and three book reviews prepared by Dan N. Stone. Of course, the views expressed herein are those of Professor Stone, not the editorial team of *The Accounting Review.* However, I would like to thank Dan for raising our awareness of the potential contribution of accounting fiction with this thought-provoking commentary and these book reviews.

DIDACTIC FICTION AS RESEARCH METHOD

Ten didactic novels are now published and in use in accounting education. In other academic disciplines (e.g., medicine, literature, sociology, communications, and business) fictional discourse has long been regarded as an effective method for exploring the complexities and intricacies of human and organizational experience. Medicine provides an example of the potential for fiction to inform and be informed by professional practices (Anderson 1990). "Literature and medicine" is now a respected, growing field of inquiry with its own journal (*Literature and Medicine*) and history of explicating the relationships between medical practice and fiction (e.g., see Stein 1984, 1985, 1991). In addition, a top medical journal (*The Journal of the American Medical Association*) regularly publishes fiction and poetry that reflect and comment on medical practice.

However, in accounting, fiction is not yet generally understood as a method of research inquiry (e.g., see Crumbley et al. 1998; Dorocak and Purvis 1998; Llewellyn 1999). Prior to reviewing three accounting novels—*Code Blue* (McDermott et al. 2000), *The Ultimate Rip-Off: A Taxing Tale* (Crumbley 1998), and *The Auditor* (Loebbecke 1998)—I explore the potential contributions of didactic fiction as a research method.

Fiction is a vast genre that includes many styles and methods (Booth 1983). In this essay, I focus on *didactic accounting fiction*, which comments on professional accounting practice and does not claim to represent the experiences of individual accountants. As a genre, didactic fiction does not include some of the narrative devices that are generally found in quantitative accounting research. For example, the best quantitative accounting research is written in passive, third-person voice (Stone 1998), uses a formulaic structure (i.e., introduction, theory, hypotheses, method, results, conclusion), includes statistical hypothesis testing (Lindsay 1994), builds and tests theory, and considers the extent to which results can be generalized to other settings, institutions, and samples.

In contrast, fictive research generally omits a meta-narrative (i.e., a theory), seeks to *show* events not tell about them, relies on dialogue to describe and explore, and often places the reader and writer in the scene (Stone 1998, in press). Fictive methods do not claim to represent the experiences of individuals or particular companies and do not comment on the generalizability of the phenomena they investigate. All of which begs the question as to whether fiction can be a research method if it does not comment on generalizability, does not generate or test theory, and does not even claim to represent anyone's real experience. Stated succinctly, how can fiction be a research method if it is unconcerned with the traditional social-science criteria of validity, reliability, objectivity, and factual truth (Banks and Banks 1998)?

As a starting point for considering these issues, consider Demski and Zimmerman's (2000, 344) recent reminder that: "For 'research,' the thesaurus lists 'experiment,' 'examine,' 'investigate,' 'probe,' and 'study' as synonyms." The best quantitative research uses theory to build empirically grounded descriptions of phenomena. The best case and field studies create theories and descriptions of people doing actual things in the actual social world. The best didactic fiction is an "experiment" in, and investigation of, the meaning and importance of accounting to individuals, organizations, and society. One of fiction research's unique contributions as a research method is its ability to situate accounting, to convey the essence of accounting-as-experience, and to explore the morality or lack thereof of accounting-relevant actions and their consequences in ways that one hopes for, but rarely finds, in experience or quantitative research.

Although they originate from different academic traditions, fiction research and analytical economic modeling approaches share the basic structure of a story (McCloskey 1985, 1990). Analytical models introduce fictional, archetypal characters—always *homo economicus* ("the economic human") and often a principal and an agent. Analytical modeling approaches explore a conflict among these characters (e.g., agents are work-averse but want rewards) and include an outcome with a moral (e.g., "...and that's why we need auditing and auditors") (see Noreen 1988). However, analytical modeling and fiction research approaches differ in their treatment of character, context, and setting. Analytical modeling approaches strive for parsimony, i.e., for the briefest possible descriptions of characters, context, and setting. In contrast, fiction research seeks rich, "thick" descriptions of character, context, and setting (e.g., see Weick 1979, 1995). In addition, the ubiquitous character of *homo economicus* vastly limits the range, scope, and believability of relevant accounting plots in analytic research due to the demand that all behavior be economically rational.

Quantitative research seeks factual truths by carefully controlling and measuring the phenomena under investigation. Quantitative methods, however, are a scalpel; they carve up the phenomena they investigate (Blackler and Brown 1983). That is, the controls and structures of quantitative research remove the phenomena under investigation from its organizational and social contexts. As will be illustrated in the novels that I later review, good fictive research provides rich, "thick" explorations of accounting content in context.

Fictive research also expands the possibilities for exploring controversial accounting issues and problems (e.g., accountants' misconduct, fraud, and violations of privacy) that are potentially infeasible if undertaken using "factual" research methods. If accounting research includes a goal of exploring the effects of accounting on individuals and organizations, then "factual" accounts of controversial accounting phenomena carry considerable and particular risks. Even when possible, disclosing individuals' thoughts or controversial actions could embarrass research participants, their colleagues, or their organizations. For example, a recent paper investigating the role of accounting firms in money laundering likely earned the authors few friends among the investigated public accounting firms (Mitchell et al. 1998). Further, differing accounts of controversial events could invite litigation and risk, further alienating the professional and academic accounting communities. Consequently, fiction significantly expands the genre of accounting research by broadening its set of askable research questions.

The absence of an author-imposed "theory" in fiction, i.e., the lack of a framework or model that tells the reader the meaning of the "data," demands that readers construct their own understanding of the role of accounting in a story (Barthes 1974; Cooper and Puxty 1994). Good fictive research presents characters struggling with complicated ethical dilemmas for which there is no "theory" that can easily resolve the conflict. Such fiction creates the possibility for observing characters' feelings and actions, and their consequences, in accounting-relevant settings. Fiction is unique among methods in its ability to place characters in the midst of realistic, complicated ethical dilemmas, allowing us to observe their actions and feelings (cf. Rorty 1989). These explorations can lead readers to reflect on the moral quality of their own lives in relation to the fictional characters about whom they read.

Although infrequently explored in existing fictive research, fiction offers the possibility of "experiments" in possible futures for accounting and accountants. Technological change has brought accounting to a precipice (Elliott 1992; Albrecht and Sack 2000). The conflicting demands of market demands, independence, professionalism, and changing organizational forms have eroded the traditional economic bases of accounting practice. Fiction research offers a method for exploring the possibilities of remaking accounting to meet the changing demands for accounting services. Boland's (1984) case analysis of supplying fictional accounting reports to organizational managers illustrates one possible method of using fiction to explore possible future personal, organizational, or professional selves (cf. Markus and Nurius 1986).

To reiterate, how can fiction be considered a research method if it is unconcerned with validity, reliability, objectivity, and factual truth? Embracing fictive research requires the acceptance of a different set of research criteria. Good fictive research offers well-crafted stories that provide intimate experience with (often under-studied) accounting issues and problems. Good fictive research provides insight into the personal, organizational, and social meaning and morality of accounting phenomena. In place of a dominant criteria of correspondence between observed and imagined (i.e., fictional) world, fictive research strives to capture the complexities and emotions of relevant accounting issues and problems through imaginative narrative.

I next review three novels that contribute to accounting research by deepening our understanding of professional accounting practice.

R. E. MCDERMOTT, K. D. STOCKS, AND J. OGDEN, *Code Blue* (Syracuse, NY: UT, Traemus Books, 2000, 175 pp., $19.95, Pb, http://www.traemus-books.com/).

Modeled after the highly successful *The Goal* (Goldratt and Cox 1992), *Code Blue* is a fictional case study of the near-bankrupt Peter Brannan Private Hospital's efforts to achieve financial stability and high-quality service. Following the suspicious deaths of the Chief Administrator and Assistant Controller, the Hospital's Board of Directors hires Wes Douglas, a local CPA, as acting Hospital Administrator. Douglas' lack of knowledge about health care affords an opportunity to summarize the history of U.S. health-care economics and the roles of politics and accounting in hospital management. One of the book's strengths is its inclusion of three supplemental appendices that include 15 "tutorial" chapters primarily focused on hospital and health-care accounting issues, and guides to medical, accounting, and economic terminology and abbreviations.

The novel's research contributions include its detailed analysis of the role of accounting in hospital management, its interwoven description of the evolution of the health-care industry and accounting's role in this evolution, and its exploration of the accounting-relevant conflicts between regulators, physicians, HMOs, and administrators. *Code Blue* consistently maintains a high ratio of relevant accounting and industry content to irrelevant asides and plot twists. With the brief exception of the conclusion, the novel focuses on the health-care industry, while simultaneously maintaining an engaging set of conflicts that hold clear relevance to understanding accounting and accountants' roles in hospitals and health care.

D. LARRY CRUMBLEY, *The Ultimate Rip-off: A Taxing Tale* (Sun Lakes, AZ: Thomas Horton and Daughters, 1998, 227 pp., $10.95, Pb, http://www.bus.lsu.edu/accounting/faculty/lcrumbley/ripoff.html).

The central problem of the murder mystery as didactic accounting novel, pioneered by Larry Crumbley and his co-authors, is that accounting frequently becomes a minor character in the unfolding of the plot. Irrelevancies overwhelm the character of accounting, and the story becomes about murder and art (e.g., Crumbley's *Deadly Art Puzzle, Costly Reflections in a Midas Mirror*), murder and baseball (e.g., Crumbley's *The Big "R"*), or attempted murder and international jewelry theft (e.g., Crumbley's *Accosting the Golden Spire*).

Successful didactic accounting fiction maintains accounting as a central character, and *The Ultimate Rip-Off* is Crumbley's work that comes closest to achieving this goal. Taxation, the IRS, and IRS agents and their behavior, are the central focuses of the first half of the novel. The novel's principal character, IRS Special Agent Jeff Burke, pursues tax cheats engaged in illegal gambling, money laundering, and eventually (and unfortunately) political corruption and murder-by-snakebite.

Among Crumbley's unique contributions to accounting research is his portrayal of accounting professionals as morally complex and ambiguous. For example, Jeff Burke "did not mind breaking the law a bit when he was dealing with organized crime" (p. 56), and, spends the night with a married woman (who later tries to kill him). A fellow IRS agent gratuitously and mean-spiritedly pokes small holes in condoms owned by a tax-cheat suspect. At the same time, the novel portrays IRS agents as working relentlessly and effectively in pursuit of the desirable social goal of improving tax receipts by catching and prosecuting tax cheats. Crumbley's fictional portrayals of accounting professionals as morally ambiguous characters offer one of the few possibilities in accounting research for contrasting the ethical and moral ideals of professional accounting standards with behavior that falls short of these ideals.

However, the novel hits some sour notes. It mixes factual and fictive descriptions in ways that sometimes confuse the reader. For example, a fictional, corrupt IRS commissioner appears in the novel along with considerable doses of valuable factual information about the IRS, the tax code, and tax cases. Some will object to the sexual (and perhaps even sexist) content. Unfortunately, the novel's second half loses its focus on the IRS and taxation as central characters and pursues irrelevancies (e.g., rare-coin collecting, murders, and attempted murders, national politics) that obscure the novel's relevance as didactic accounting fiction.

LOEBBECKE, JAMES K., *The Auditor: An Instructional Novella* (Upper Saddle River, NJ: Prentice Hall, 1998, 117 pp., $18, Pb, http://vig.prenhall.com/academic/product/1,4096,0130799769,00.html).

I have previously reviewed *The Auditor* in depth (Stone in press). Herein, I revisit this novella from the perspective of the theme of this essay, which differs from that of my previous review. *The Auditor* is a hero's story (cf. Woods 1982) that traces Jack Butler's ascent from college student to partner-in charge of a "Big 5ish" accounting firm's local office. With the exception of the conclusion, the plot is episodic, i.e., consisting of events of similar emotive magnitude (Kubis and Howland 1985).

The Auditor succeeds in achieving a largely realistic portrayal of the syncopation and pace of life in a large, public accounting firm. This is both the novella's greatest virtue and vice. For while the novella reflects the day-to-day events of life in a public accounting firm; day-to-day life in a public accounting firm is often dull. The novella's principal cast, all of whom are potential candidates for sainthood, compounds this dullness. The essence of drama is conflict. While a cast of reasonable, agreeable accountants may be ideal for a Sunday dinner, it makes for a novella that lacks dramatic conflict and tension.

The reasonable, agreeable central cast of *The Auditor* also lacks the emotions and foibles that make for real characters and presumably real accountants. By way of contrast, consider John Lanchester (2000) recently published *Mr. Phillips*, a devastatingly intimate portrait of the mind of a recently fired accountant. While Mr. Phillips is generally dislikable, he offers a fascinating glimpse into the power of a professional accounting life to shape one's personal thoughts and habits. In contrast, *The Auditor* successfully portrays the events of a professional accountant's life, but without a convincing characterization of accountants' and accounting stakeholders' inner lives.

CONCLUSION

Many of the critical issues of accounting (e.g., what should our profession become?) are perhaps best explored through methods (e.g., case study, fictive research) that American academic accountants generally ignore. Retaining our relevance to accounting practice requires reconsideration of the meaning of "empirical" and a resulting expanded arsenal of research methods. Fictive research can help us make sense of a profession that is in profound transition. Perhaps, one day accounting research colloquia will draw large academic and professional audiences who passionately discuss the latest didactic accounting novels and their implications for professional practice. Perhaps, one day universities will promote and tenure junior accounting faculty based on their novels, short stories, and poems. And perhaps, one day an accounting academic will win a Nobel Prize for didactic accounting fiction research.

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Reviewer's note: Sincere thanks to the Gatton College of Business and Economics for grants supporting my research and to my colleagues (local and global) for their patience, tolerance, wisdom, good humor, and dedication. Thanks also to Larry Crumbley for his cooperation and assistance, to Jane Reimers for her insightful editing, and to workshop participants at the University of Kentucky Von Allmen School of Accountancy for their thoughtful comments and suggestions on a previous draft.

REFERENCES

Albrecht, W. S., and R. J. Sack. 2000. *Accounting Education: Charting the Course through a Perilous Future*. Accounting Education Series, No. 16. Sarasota, FL: American Accounting Association.

Anderson, C. 1990. Literature and medicine: Why should the physician read... or write? In *Literature and Science: Theory and Practice*, edited by S. Peterfreund, 33–57. Boston, MA: Northeastern University.

Banks, S. P., and A. Banks, eds. 1998. Ethnographic alternatives. In *Fiction and Social Research: By Ice or Fire*. Walnut Creek, CA: AltaMira.

Barthes, R. 1974. *S/Z*. New York, NY: Hill and Wang.

Blackler, F. H., and C. A. Brown. 1983. Qualitative research and paradigms of practice. *Journal of Management Studies* 20 (3): 349–365.

Boland, R. J., Jr. 1984. Sense-making of accounting data as a technique of organizational diagnosis. *Management Science* 30: 868–882.

Booth, W. C. 1983. *The Rhetoric of Fiction*. Chicago, IL: University of Chicago Press.

Cooper, C., and A. Puxty. 1994. Reading accounting writing. *Accounting, Organizations and Society* 19 (2): 127–146.

Crumbley, D. L. 1998. *The Ultimate Rip-off: A Taxing Tale*. Sun Lakes, AZ: Thomas Horton and Daughters.

———, K. T. Smith, and M. Smith. 1998. Educational novels and student role-playing: A teaching note. *Accounting Education* 7 (2): 183–191.

Demski, J. S., and J. L. Zimmerman. 2000. On "research vs. teaching": A long-term perspective. *Accounting Horizons* 14 (September): 343–352.

Dorocak, J. R., and S. E. C. Purvis 1998. Using fiction in accounting courses: Why not admit it? *Advances in Accounting Education* 1: 69–92.

Elliott, R. K. 1992. The third wave breaks on the shores of accounting. *Accounting Horizons* 6 (June): 61–85.

Goldratt, E. M., and J. Cox 1992. *The Goal: A Process of Ongoing Improvement*. Great Barrington, MA: North River Press.

Kubis, P., and R. Howland 1985. *The Complete Guide to Writing Fiction, Nonfiction, and Publishing*. Reston, VA: Reston Publishing.

Lanchester, J. 2000. *Mr. Phillips*. New York, NY: Putnam Publishing Group.

Lindsay, R. M. 1994. Publication system biases associated with the statistical testing paradigm. *Contemporary Accounting Research* 11 (Summer): 33–57.

Llewellyn, S. 1999. Narratives in accounting and management research. *Accounting, Auditing and Accountability Journal* 12 (2): 220–236.

Loebbecke, J. K. 1998. *The Auditor: An Instructional Novella.* Upper Saddle River, NJ: Prentice Hall.

Markus, H., and P. Nurius 1986. Possible selves. *American Psychologist* 41 (9): 954–969.

McCloskey, D. N. 1985. *The Rhetoric of Economics.* Madison, WI: University of Wisconsin Press.

———. 1990. *If You're So Smart: The Narrative of Economic Expertise.* Chicago, IL: University of Chicago Press.

McDermott, R., K. Stocks, and J. Ogden. 2000. *Code Blue.* Syracuse, NY: UT, Traemus Books.

Mitchell, A., P. Sikka, and H. Wilmott. 1998. Sweeping it under the carpet: The role of accountancy firms in moneylaundering. *Accounting, Organizations and Society* 23 (5/6): 589–607.

Noreen, E. 1988. The economics of ethics: A new perspective on agency theory. *Accounting, Organizations and Society* 13 (4): 359–369.

Rorty, R. 1989. *Contingency, Irony, and Solidarity.* New York, NY: Cambridge University Press.

Stein, H. F. 1984. Farming in Chelm: A medical allegory. *The Journal of Family Practice* 38 (May): 534–536.

———. 1985. Portrait of a young physician. *The American Scholar* 54 (4): 485–499.

———. 1991. Pupils. *Journal of the American Medical Association* 266 (21): 2941–2942.

Stone, D. 1998. Revisioning psychology-based accounting research: Not truth-telling but storytelling. *Advances in Accounting Behavioral Research* 1: 3–9.

———. Accountants' tales. *Accounting, Organizations and Society* (forthcoming).

Weick, K. E. 1979. *The Social Psychology of Organizing.* Reading, MA: Addison-Wesley.

———. 1995. *Sensemaking in Organizations.* Thousand Oaks, CA: Sage.

Woods, R. C. 1982. Rituals and stories, heroes and priests. *Inc.* (December): 105–106.

Editorial Data

The following table contains information about turnaround time for manuscripts received (including revisions) in the 12-month period ended November 30, 2000. Turnaround time is the number of days between the date that the manuscript was received *and the date of the editor's letter to the author(s).*

	Number of Manuscripts	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	80	80	26.85
31 ≤ Days ≤ 60	112	192	64.43
61 ≤ Days ≤ 90	81	273	91.61
91 ≤ Days ≤ 120	23	296	99.33
121 ≤ Days	2	298	100.00

The mean review time was 49 days; the median review time was 51 days.

EDITORIAL POLICY AND STYLE INFORMATION

EDITORIAL POLICY

According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal....No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

The primary criterion for publication in *The Accounting Review* is the significance of the contribution an article makes to the literature.

The efficiency and effectiveness of the editorial review process is critically dependent upon the actions of both authors submitting papers and the reviewers. Authors accept the responsibility of preparing research papers at a level suitable for evaluation by independent reviewers. Such preparation, therefore, should include subjecting the manuscript to critique by colleagues and others and revising it accordingly prior to submission. The review process is not to be used as a means of obtaining feedback at early stages of developing the research.

Reviewers and associate editors are responsible for providing critically constructive and prompt evaluations of submitted research papers based on the significance of their contribution and on the rigor of analysis and presentation. Associate editors also make editorial recommendations to the editor.

MANUSCRIPT PREPARATION AND STYLE

The Accounting Review's manuscript preparation guidelines follow (with a sight modification) the B-format of *The Chicago Manual of Style* (14th ed.; University of Chicago Press). Another helpful guide to usage and style is *The Elements of Style*, by William Strunk, Jr., and E. B. White (Macmillan). Spelling follows *Webster's International Dictionary.*

FORMAT

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2. Manuscripts should be as concise as the subject and research method permit, generally not to exceed 7,000 words.
3. Margins of at least one inch from top, bottom, and sides should facilitate editing and duplication.
4. To promote anonymous review, authors should not identify themselves directly or indirectly in their papers or in experimental test instruments included with the submission. Single authors should not use the editorial "we."
5. A cover page should show the title of the paper, the author's name, title and affiliation, email address, any acknowledgments, and a footnote indicating whether the author would be willing to share the data (see last paragraph in this statement).

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Numbers: Spell out numbers from one to ten, except when used in tables and lists, and when used with mathematical, statistical, scientific, or technical units and quantities, such as distances, weights and measures. For example: *three days; 3 kilometers; 30 years*. All other numbers are expressed numerically.

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Hyphens: Use a hyphen to join unit modifiers or to clarify usage. For example: *a well-presented analysis; re-form*. See *Webster's* for correct usage.

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An Abstract of about 100 words should be presented on a separate page immediately preceding the text. The Abstract should concisely inform the reader of the manuscript's topic, its methods, and its findings.

Keywords and the Data Availability statements should follow the Abstract. The text of the paper should start with a section labeled "I. Introduction," which provides more details about the paper's purpose, motivation, methodology, and findings. Both the Abstract and the introduction should be relatively nontechnical, yet clear enough for an informed reader to understand the manuscript's contribution. The manuscript's title, but neither the author's name nor other identification designations, should appear on the Abstract page.

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The author should note the following general requirements:

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Dye, R., B. Balachandran, and R. Magee. 1989. Contingent fees for audit firms. Working paper, Northwestern University, Evanston, IL.

Fabozzi, F., and I. Pollack, eds. 1987. *The Handbook of Fixed Income Securities*. 2nd edition. Homewood, IL: Dow Jones-Irwin.

Kahneman, D., P. Slovic, and A. Tversky, eds. 1982. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, U.K.: Cambridge University Press.

Porcano, T. M. 1984a. Distributive justice and tax policy. *The Accounting Review* 59 (October): 619–636.

———. 1984b. The perceived effects of tax policy on corporate investment intentions. *The Journal of the American Taxation Association* 6 (Fall): 7–19.

Shaw, W. H. 1985. Empirical evidence on the market impact of the safe harbor leasing law. Ph.D. dissertation, The University of Texas at Austin.

Sherman, T. M., ed. 1984. *Conceptual Framework for Financial Accounting*. Cambridge, MA: Harvard Business School.

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3. Four copies should be submitted together with a check in U.S. funds for $75.00 for members or $100.00 for nonmembers of the AAA made payable to the American Accounting Association. Effective January 1990, the submission fee is nonrefundable.
4. The author should retain a copy of the paper.
5. Revisions must be submitted within 12 months from request, otherwise they will be considered new submissions.

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Comments on articles previously published in *The Accounting Review* will be reviewed (anonymously) by two reviewers in sequence. The first reviewer will be the author of the original article being subjected to critique. If substance permits, a suitably revised comment will be sent to a second reviewer to determine its publishability in *The Accounting Review*. If a comment is accepted for publication, the original author will be invited to reply. All other editorial requirements, as enumerated above, also apply to proposed comments.

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APRIL 2001 PLACEMENT ADS

The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The ***Review*** *is published on the first day of January, April, July, and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.*

201 UNIVERSITY OF NEBRASKA AT OMAHA invites applications for Assistant Professor of Accounting for Fall 2001. The Department of Accounting consists of 15 FTE faculty and offers both undergraduate and graduate programs in Accounting. The AACSB-accredited College of Business Administration has approximately 2,000 undergraduate majors and 400 graduate students. Candidates should have a commitment to teaching excellence and demonstrate the ability to publish high-quality research. An earned doctorate (ABD considered) is required. Salary is competitive and commensurate with qualifications. Send letter of application, resume, dissertation proposal or research paper, and two letters of recommendation to Professor Richard G. File, Chair, Faculty Search Committee, Department of Accounting, CBA 408, University of Nebraska at Omaha, Omaha, NE 68182.

202 DEPAUW UNIVERSITY, Department of Economics and Management, invites applications for a tenure-track position starting August 2001. Rank and salary commensurate with credentials and experience. Candidates must be committed to teaching undergraduate Financial Accounting, Managerial Accounting, and possibly other Management courses. DePauw is nationally recognized for educating liberal arts students to become professional managers. Relevant credentials include M.A. in Accounting, M.B.A. with a specialty in Accounting, or appropriate Ph.D. in Management or Economics. Review of applications begins immediately and continues until the position is filled. Send letter of application, ***curriculum vitae***, evidence of teaching interests and ability, plan for professional growth and development activities, graduate transcript, and three letters of reference. Contact Daniel Wachter, Chair, Search Committee, Department of Economics and Management, DePauw University, Greencastle, IN 46135. DePauw University is a selective, four-year, residential liberal arts college. The University as an EO/AA encourages applications from women and minority candidates.

203 UNIVERSITY OF ST. THOMAS, located in St. Paul and downtown Minneapolis, is seeking applications for experienced and entry-level faculty for tenure-track positions in Accounting at the Associate/Assistant Professor levels for the academic year 2001–2002. Appointments will be to the College of Business, which includes both undergraduate and graduate business programs. Qualifications: Ph.D., D.B.A., or ABD with completion of doctorate expected by Summer 2001. Previous teaching and business experience preferred. Candidates should show a demonstrated capability for research and commitment to excellence in college teaching. The University of St. Thomas offers a competitive salary and an excellent benefits package including generous retirement benefits, free college tuition for our employees, and a 75% tuition reduction for dependent children and spouses. Additional information about the University may be found at http://www.stthomas.edu. Send cover letter (refer to 200019) and application to Human Resources, Mail #AQU 217, 2115 Summit Avenue, St. Paul, MN 55105-1078. Application materials are reviewed until positions are filled. AA/EOE.

204 EASTERN ILLINOIS UNIVERSITY, School of Business, invites applications for a tenure-track Assistant Professor of Accountancy beginning August 2001 (may be considered for The Holley Distinguished Professor of Ethics and Social Responsibility) teaching undergraduate/graduate courses in Accounting Information Systems and Managerial Cost Accounting with other Accounting assignments. In addition, candidate will participate in curriculum development, conduct research, and participate in other activities as appropriate. Candidates should have a Ph.D. or D.B.A. in Accountancy. An established record of intellectual contributions or documented potential for such contributions will be required with preference given to individuals with professional certification in Accounting, teaching and business experience, a demonstrated interest in the integration of Accounting with other disciplines, alternate learning styles such as collaborative or distance learning, and knowledge of AACSB-accreditation procedures. Interested candidates should contact Dr. Wayne Chandler, Associate Chair, School of Business, Eastern Illinois University, Charleston, IL 61920; Phone: (217) 581-6646; Fax: (217) 581-6642; Email: cfewc@eiu.edu.

205 MISSISSIPPI STATE UNIVERSITY announces an opening for a tenure-track position teaching in the School of Accountancy beginning Fall 2001. Appointment is at the Assistant Professor rank, teaching undergraduate and graduate courses in the areas of either Accounting Information Systems, Auditing, and/or Financial Accounting. A doctorate degree in Accounting or to be near completion is required. The position requires excellence in teaching, based on prior experience as a Graduate Teaching Assistant or as an Instructor or Assistant Professor; the ability to do research leading to publication in nationally refereed journals; and an interest and willingness to be involved in professional accounting activities. Professional certification and professional accounting experience are highly desirable. Competitive salary. Send letter of application, current *curriculum vitae*, and three reference letters to Dr. Dan Hollingsworth, Director, School of Accountancy, Box EF, Mississippi State, MS 39762. Position will remain open until filled. AA/EOE.

206 INSTITUTO DE EMPRESA, Madrid, Spain, Accounting Department, invites applications for two positions effective September 2001. Applicants should hold a Ph.D.; ABD candidates will be considered if degree requirements can be completed prior to the appointment date. Applicants must show evidence of top-quality research potential as well as excellence in teaching in English and Spanish. Professional certification is desirable. The teaching load equates to a six-semester-hour load and applicants will teach in the International M.B.A. program (in English) and the M.B.A. and Master's programs (in Spanish). Core courses to teach include Financial Accounting for Managers, Cost Accounting, and Management Control Systems. Compensation is competitive and will be commensurate with the candidate's qualifications and experience. Please send a letter of application and *curriculum vitae* in writing or electronically to Dr. Scott Eriksen, Instituto de Empresa, Maria de Molina 12 5°, Madrid 28006 Spain; Telephone: (34) 91 563 9318. Email: Scott.Eriksen@ie.edu.

207 SAMFORD UNIVERSITY invites applications for a tenure-track position as Assistant or Associate Professor of Accountancy in the School of Business for the 2001–2002 academic year. All applicants must hold an Accounting doctorate and be academically qualified under AACSB standards. Certifications are preferred. Candidates should exhibit a commitment to teaching excellence, a commitment to produce quality scholarly publications, and an interest in interaction with the profession. Candidates should be interested in teaching Financial Accounting for undergraduate and graduate students. Interest in teaching Auditing and/or Systems also is desirable. Samford University offers a dynamic learning experience for about 4,500 students on a beautiful campus in suburban Birmingham, Alabama. Samford's Business degrees include a bachelor's in Accounting, a master's in Accountancy aimed at preparing students for certification and success in the profession, and an M.B.A. with several courses in Accounting and Taxation. Please submit a *curriculum vitae* to Dr. William A. Raabe, Director of Accounting Programs, Samford University School of Business, 800 Lake Shore Drive, Birmingham, AL 35229; Email: waraabe@samford.edu.

208 UNIVERSITY OF MASSACHUSETTS BOSTON invites applications for tenure-track positions at the Assistant level beginning Fall 2001. Special consideration will be given to candidates with a primary interest in Financial and/or Tax. A Ph.D. in Accounting is required, but ABDs nearing completion will be considered. Send *curriculum vitae* to Arindam Bandopadhyaya, Chair, Department of Accounting and Finance, College of Management, University of Massachusetts Boston, 100 Morrissey Boulevard, Boston, MA 02125-3393. University of Massachusetts Boston is an Equal Opportunity/Affirmative Action Employer.

209 UNIVERSITY OF HOUSTON–CLEAR LAKE, School of Business and Public Administration, is seeking an Assistant Professor of Accounting beginning August 2001. A doctorate in Accounting is required unless significant progress on a dissertation has been made. Position requires teaching 9 semester hours of undergraduate and/or graduate Accounting courses. The ability to teach several different Financial Accounting courses and engage in research and service is required. Please send a letter of application, *curriculum vitae*, and three letters of recommendation to Chair of Accounting Search Committee, University of Houston–Clear Lake, MC167, 2700 Bay Area Boulevard, Houston, TX 77058-1098. Review of applicants begins immediately and continues until the position is filled. The University reserves the right not to fill the position. UHCL is an upper-level university (junior, senior, and master's students) adjacent to NASA–Johnson Space Center, conveniently located between Houston and Galveston Island, Texas. AA/EEO Employer Supporting Workforce Diversity.

210 UNIVERSITY OF WISCONSIN–PARKSIDE invites applications for a tenure-track position starting August 2001 (rank open). Ph.D. is preferred (ABD considered), teaching interests should be in at least two of the following areas: Managerial/Cost, Auditing/Systems, Governmental/Advanced/Not-for-Profit, or Financial. UW–Parkside is located between Chicago (60 miles) and Milwaukee (35 miles). Programs (M.B.A. and undergraduate) are accredited by AACSB. A full position description and more information are available at: http://www.uwp.edu/academic/business. Send cover letter, current *curriculum vitae*, teaching evaluations, and have three letters of reference sent on your behalf to Dr. Karen Crooker, Chair, Accounting Search & Screen Committee, University of Wisconsin–Parkside, Box 2000, Kenosha, WI 53141-2000. Applications will be accepted until the position is filled. The University of Wisconsin–Parkside is an AA/EEO employer. D/M/W/V.

211 THE UNIVERSITY OF TEXAS AT AUSTIN, Department of Accounting, College of Business, is recruiting at all academic ranks for Accounting positions to begin September 1, 2001. Applicants for the positions of Assistant Professor should be near completion or have completed a Ph.D. or D.B.A. program in Business Administration or a related field, have superior records in their programs, and have demonstrated potential for excellence in teaching and research. Excellent English communication skills are required. Successful candidates are expected to pursue an active research program, perform graduate and undergraduate teaching, and supervise graduate students. Applicants should submit *curriculum vitae*, academic transcripts, references, research proposals, and/or samples of research to Dr. Steve Limberg, Chairman, Department of Accounting, CBA 4M.202, Red McCombs School of Business, The University of Texas, Austin, TX 78712-1172. The University of Texas at Austin is an Equal Opportunity Employer.

212 UNIVERSITY OF TOLEDO invites applicants for one tenure-track position at the Assistant Professor level beginning Fall 2001. Applicants must have an interest in teaching Financial Accounting (and possibly Auditing) at undergraduate and graduate levels. Faculty is also expected to be actively involved in scholarly activities and provide service to the profession and the community. Applicants should have a Ph.D. or D.B.A. in Accounting from an accredited university or ABD with an expected completion by May 2001 is required. Professional certification (CPA, CMA, CIA) and relevant professional work experience are highly desirable. Evidence supporting quality teaching and strong research potential must be provided. The position is open until filled. Send letter of application and letters of recommendation to Diana Franz, Chair Department of Accounting, College of Business Administration, University of Toledo, Toledo, OH 43606; Email: Diana.Franz@utoledo.edu. The University of Toledo is an AA/EOE.

213 McKENDREE COLLEGE seeks applications for an Assistant Professor, a tenure-track position in Accounting. A terminal degree in Accounting or a related field is preferred, but candidates with a master's degree, a CPA, and those who are working toward the terminal degree may be considered. The successful candidate will teach Auditing, Accounting Theory, and other undergraduate Accounting courses as needed. Duties include teaching 12 credit hours per semester in day, evening, and off-campus programs; student advising; institutional service; and course/curriculum development. Salary and benefits are competitive with similar institutions. Web site: http://www.mckendree.edu. Interviews will begin immediately and will continue until position is filled. Please send letter of application and *curriculum vitae* to Dr. Roger Smalley, Chair, Accounting Search Committee, McKendree College, 701 College Road, Lebanon, IL 62254-1299. Founded in 1828, McKendree is a career-oriented liberal arts college located approximately 25 miles from downtown St. Louis, Missouri. AA/EEO/ADA.

214 UNext, committed to building the world's premier online university and to providing top-quality education to working adults worldwide, invites candidates with strong leadership skills to apply for their Advisory Faculty staff to help manage online instructors. Advisory Faculty are accountable for the operations and overall quality of course delivery for a team of faculty. They guide Adjunct Faculty on content-related questions that arise in course delivery. The ideal candidate will have 5+ years of relevant work experience, some teaching experience, along with a graduate or post-graduate degree in Business. The candidate must demonstrate strong organizational, management, analytical, and communication skills as well as technological savvy. Visit our web site at http://www.unext.com. Please reference the discipline number when submitting your resume by email to jobs@unext.com: Corporate Finance #01-000511, Accounting #01-000512, Marketing #01-000513, Data Mining #01-000514. UNext is an Equal Opportunity Employer.

215 MARSHALL UNIVERSITY, Lewis College of Business, seeks applications for three tenure-track Assistant/Associate Professor positions in Accounting to begin August 2001. The positions require a Ph.D. or D.B.A. in Accounting and professional certification is desirable. Preference will be given to candidates with an interest in teaching Accounting Information Systems, Financial Accounting, or Auditing. The College is accredited by the AACSB and offers both undergraduate and graduate programs in Huntington, West Virginia, and graduate programs in Charleston, West Virginia. For additional information, see http://www.marshall.edu. Please send a letter of application, a current *curriculum vitae*, and names, addresses, and telephone numbers of at least three references to Dr. Loren Wenzel, Division Head-Accountancy/Legal Environment, Marshall University, 400 Hal Greer Boulevard, Huntington, WV 25755-2310. Positions will remain open until filled. Marshall University is an AA/EEO Employer.

216 UNIVERSITY OF WISCONSIN–OSHKOSH is seeking candidates for an Academic Staff (one year only) position (subject to funding). Candidates must have M.B.A. with Accounting emphasis or M.B.A. with professional experience in an Accounting position or Accounting Master's degree. CPA, CMA, or other Accounting-related certification is required. Courses to be taught include Auditing, Introductory Financial or Managerial Accounting, and either Governmental and Not-for-Profit Accounting or Intermediate Financial Accounting. Typically, teaching load is 15 credits. Applications received by April 30, 2001 will be guaranteed consideration. Please send letter of inquiry, resume, and three references to Joann Noe Cross, College of Business Administration, University of Wisconsin–Oshkosh, Oshkosh, WI 54901. The University of Wisconsin–Oshkosh is an Affirmative Action/Equal Opportunity Employer.

217 RYERSON UNIVERSITY, Toronto, Canada invites applications for three tenure-track positions in the Accounting Area in the School of Business Management, effective August 1, 2001. The successful candidates are expected to hold a Ph.D. or be in a Ph.D. program. Preferably the candidates will have a specialty in an Accounting area. Each appointment will be as an Assistant Professor or commensurate with the candidate's current status in another university. Salary and benefits are competitive. Located in the heart of Toronto, Ryerson is the ideal university to educate business leaders of tomorrow and to conduct strategic research in business disciplines. As a growing university, Ryerson offers great opportunities for academic career achievements. Applicants should submit by email or by mail their *curriculum vitae* (and teaching evaluations if any) by February 28, 2001 to Lee Maguire, Associate Dean, School of Business Management, Ryerson University, 350 Victoria St., Toronto Ontario M5B 2K3 CANADA; Email: lmaguire@ryerson.ca. Applications after February 2001 may be reviewed until the positions are filled.

218 UNIVERSITY OF TORONTO, Rotman School of Management, is seeking tenure-track faculty in Accounting at the Assistant, Associate, or Full Professor level. We are looking to fill two positions in July 1, 2001 and two more in July 1, 2002. Preferred candidates will be qualified to teach Financial or Managerial Accounting; possess a completed doctorate or be close to completion; possess excellent research potential or achieved research excellence; and possess effectiveness in teaching or ability to become an effective instructor. Please send a *curriculum vitae*, three letters of recommendation, and a working paper to Professor Wally Smieliauskas, Rotman School of Management, University of Toronto, 105 St. George Street, Toronto Ontario M5S 1E3, CANADA. Salary and benefits are competitive. For further information send email to smieli@rotman.utoronto.ca or visit our web site at http://www.rotman.utoronto.ca. Women and minorities are encouraged to apply.

219 THE UNIVERSITY OF TEXAS AT DALLAS (UTD) invites applications for two positions in Accounting and Information Management effective September 2001. Appointment at Assistant, Associate, or Full Professor level will be considered. Appointees must have Ph.D. or equivalent and demonstrate the ability to conduct a nationally recognized research program. Graduate education in a university emphasizing research training and ability and interest for interacting with faculty colleagues on research projects in related disciplines are desirable. Applicants should send a complete *curriculum vitae* (educational history; teaching, research and work experience; list of publications, current research papers and presentations), and names and addresses of three references to Academic Search #4082, The University of Texas at Dallas, PO Box 830688, M/S AD23, Richardson, TX 75083-0688. For more information, visit http://www.utdallas.edu/dept/acct. UTD is an AA/EOE.

220 VIRGINIA STATE UNIVERSITY invites applications for Assistant or Associate Professor of Accounting beginning in August 2001. Candidates should possess a doctorate (ABD considered) and be qualified to teach Auditing and Financial/Managerial Accounting. Please visit our web page at http://www.vsu.edu. Interested persons should submit a letter of interest, resume or *curriculum vitae*, official transcripts, and three letters of recommendation to Virginia State University, Office of Human Resources, Box 9412, Room 104, Virginia Hall, Petersburg, VA 23806. A Commonwealth of Virginia Application for Employment will be required prior to employment.

221 UNIVERSITY OF NOTRE DAME, Department of Accountancy, invites applications for position openings at the Assistant and Associate Professor levels. All research areas will be considered. Applicants for Assistant Professor positions should expect to complete doctoral degree requirements before the start of the contract period. All candidates should have a strong commitment to scholarly research and excellence in teaching. Salary is very competitive and research support is excellent. Please send *curriculum vitae* and an example of scholarly work to Professor Tom Schaefer, Chair, Department of Accountancy, Room 102D, Mendoza College of Business, University of Notre Dame, Notre Dame, IN 46556-5646. The University of Notre Dame is an Equal Opportunity/Affirmative Action Employer.

222 WAYNE STATE UNIVERSITY, School of Business Administration, invites applications for a tenure-track position as Assistant/Associate/Full Professor of Accounting. An earned doctoral degree in Accounting, with primary focus on Managerial and/or Cost Accounting, is required. Also required is a record of publications consistent with appointment rank and the expectations of this Carnegie Research University I institution. Demonstrated excellence in teaching and service is required for Associate or Full Professor applicants. Demonstrated potential is required for Assistant Professor applicants. The School of Business Administration enrolls some 1,000 undergraduate students and 1,800 graduate students, and is accredited by AACSB. The metro Detroit area offers a rich array of research opportunities for Managerial/Cost Accounting professionals. Salaries are highly competitive with a comprehensive benefits package. Review of applications will begin immediately and continue until the position is filled. Send letter indicating *curriculum vitae* and names, addresses, and phone numbers of three references to Assistant Dean of Administrative Affairs, School of Business Administration, Wayne State University, Detroit, MI 48202. Wayne State University is an Equal Opportunity/Affirmative Action Employer.

223 SOUTHWEST TEXAS STATE UNIVERSITY, College of Business Administration, Department of Accounting invites applications for a tenure-track position as Assistant, Associate, or Full Professor for the 2001–2002 academic year, subject to funding. Candidates should exhibit a capacity to produce quality research and a commitment to teaching excellence and to professional interaction. Candidates will be expected to teach Tax or Governmental Accounting at the undergraduate level and one other area of Accounting. Southwest Texas State University's College of Business Administration is accredited by the AACSB. Please submit *curriculum vitae* and three letters of recommendation to Dr. Joseph L. Humphrey, Search Committee Chair, Department of Accounting, College of Business Administration, Southwest Texas State University, San Marcos, Texas 78666. Southwest Texas State University is an Affirmative Action/Equal Opportunity Employer. Women, minorities, and individuals with disabilities are encouraged to apply.

224 OHIO UNIVERSITY, School of Accountancy, invites applications for the position of Instructor or Lecturer for an appointment beginning with the 2001–2002 academic year. The appointment is renewable. This individual will teach three classes of Introductory Financial/Managerial Accounting each quarter (12 credit hours each quarter). All applicants must hold a Master's degree and a professional certification (CPA, CMA, CIA). Applicants must also possess recent relevant professional experience and the ability and commitment to deliver excellent teaching. Application deadline is May 15, 2001. Ohio University's College of Business and its School of Accountancy are accredited by the AACSB. Ohio offers two Accounting programs: the B.B.A. and the Master of Science in Accountancy (M.S.Acc). The University occupies a beautiful residential campus in scenic southeast Ohio. Please submit resume, transcripts, and three letters of recommendation to Dr. Florence C. Sharp, Search Committee Chair, School of Accountancy, Copeland Hall, Ohio University, Athens, Ohio 45701. Ohio University is an Equal Opportunity Employer. Women, minorities, and individuals with disabilities are encouraged to apply.

225 COLUMBUS STATE UNIVERSITY, Abbott Turner College of Business, invites applications for one or more tenure-track appointments as Assistant Professor of Accounting starting Fall 2001. Desired qualifications include earned doctorate in Accounting (ABD may be considered) with primary teaching areas of Tax, Accounting Information Systems, and Financial Accounting. Columbus State University, with an enrollment of 5,300, is a member of the University System of Georgia. The College of Business has approximately 1,000 undergraduate students with majors in Accounting, Computer Information Systems, Finance, Management, Marketing, and General Business, an M.B.A. program with approximately 50 students, and is actively seeking AACSB accreditation. Emphasis is placed on teaching excellence, academic scholarship, and service to the community. Please send resume or inquiries to Arthur Joy, Chair, Accounting Search Committee, Abbott Turner College of Business, 4225 University Ave., Columbus, GA 31907-5645 or electronically to joy Arthur@colstate.edu. Phone: (706) 562-1659; Fax: (706) 568-2184. CSU is an AA/EEO Employer.

226 UNIVERSITY OF EVANSVILLE invites applications for an anticipated tenure-track Assistant Professor of Accounting position beginning Fall 2001. Teaching responsibilities include various Accounting courses, Income Tax, and Quantitative Methods courses. Faculty are expected to provide quality teaching and be actively involved in research and professional activities in the field of Accounting. They are also expected to participate in service activities and be a part of the student advising system. Candidates should hold a Ph.D./D.B.A. in Accounting; Accounting educator/practitioner experience is desirable. Salary and benefits are competitive. Please send application letter, resume, and list of three references to Dr. David B. Reeder, Jr., Dean, School of Business Administration, University of Evansville, 1800 Lincoln Avenue, Evansville, IN 47722; Phone: (812) 479-2866; Fax: (812) 479-2872; Email: dr4@evansville.edu. UE is an Equal Opportunity/Affirmative Action Employer and actively seeks the candidacy of minorities and women.

227 University of Missouri–St. Louis, College of Business Administration, invites applications for the position of Coordinator of Accounting (equivalent to a department chair). Required qualifications include a doctorate in Accounting or a closely related area and a record of scholarship and teaching appropriate for an appointment with tenure at the rank of Associate or Full Professor. The College currently offers undergraduate and master's degree programs including a B.S. in Accounting and a Master of Accounting. All programs are AACSB-accredited. The successful candidate should have a strong commitment to excellence in teaching and research and to working with the professional community. Interested candidates should contact John J. Anderson, Professor and Interim Coordinator of Accounting, College of Business Administration, University of Missouri–St. Louis, 8001 Natural Bridge Road, St. Louis MO 63121; Email: jackanderson@umsl.edu. The University is an Affirmative Action/Equal Opportunity Employer committed to excellence through diversity.

228 UNIVERSITY OF OREGON, Department of Accounting, invites applications for an Instructor of Accounting effective September 16, 2001. Candidates should have demonstrated teaching excellence at undergraduate level. Responsibilities include teaching Introductory and Advanced Accounting courses to undergraduate business majors and teaching courses in business minor subjects; advising students; and providing service on committees and other assignments. Appointment is subject to renewal based on performance. Master's degree is required, Ph.D. preferred. Salary is competitive. To apply, send letter of interest, *curriculum vitae*, statement of teaching interests, evidence of teaching performance, and three reference letters to Accounting Instructor Search Committee, Lundquist College of Business, 1208 University of Oregon, Eugene, OR 97403-1208; Fax: (541) 346-3341. Deadline is March 1, 2001 or until position is filled. The University of Oregon is an AA/EO/ADA institution committed to cultural diversity.

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DHAHRAN, SAUDI ARABIA

College of Industrial Management
Department of Accounting & Management Information Systems

Invitation for Accounting Faculty Applications

Our Department invites applications for all professorial ranks in Accounting. Candidates must have an earned Ph.D. or DBA with an Accounting major. Priority will be given to candidates with strength in *Accounting Information Systems, Auditing and Financial Accounting.* All applicants are expected to commitment to teaching and research excellence.

In addition to providing an environment conducive for professional life and for living a very peaceful and safe family life, KFUPM offers the following benefits:

- Paid annual vacation for 60 days.
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- Free medical and dental services provided at KFUPM Medical Center
- Termination of service benefit payable at the final termination of contract.
- Transportation allowance.
- Opportunities such as short course and summer program teaching are available to greatly supplement income.
- Annual repatriation air tickets, if needed, for the faculty member and his dependents from Dammam to point of origin.
- Free transportation within campus and to city centers.

Candidates should send visa, application letter (including e-mail address) and list of three references to:

Dr. Nassar M. Shaikh
Chairman, Dept. of Accounting & MIS
KFUPM Box 5076, DEPT. CIMA-2112
Dhahran, 31261, Saudi Arabia
E-mail: nshaikh@kfupm.edu.sa
Fax: 00966-3-860-3489

Dean, Faculty & Personnel Affairs,
King Fahd University of Petroleum & Minerals
DEPT. CIMA-2112
Dhahran, 31261, Saudi Arabia
E-Mail: faculty@kfupm.edu.sa
Fax: 00966-3-860-2429

Please visit our website address: http://www.kfupm.edu.sa

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University of Notre Dame
Arthur Andersen Chair in Accountancy

The University of Notre Dame seeks to fill the Arthur Andersen Chair in Accountancy. Candidates should possess a distinguished research and teaching record, and a strong commitment to scholarly leadership. The individual should also possess credentials appropriate for a tenured appointment at the rank of full professor. Candidates from all accountancy research areas will be considered for appointment.

Expected responsibilities of the Arthur Andersen Chair include leadership in scholarly research and curriculum development, graduate and undergraduate teaching, and significant interaction with College of Business faculty and the professional community.

Chairs at Notre Dame are backed by major endowments. In addition, chairholders normally receive reduced teaching loads, research expense allowances, as well as other significant forms of support. Please send vita and references to

Professor Thomas Schaefer, Chairperson,
College of Business, University of Notre Dame,
Notre Dame, IN 46556-5646

The University of Notre Dame is an affirmative action, equal opportunity employer.

Business

McMaster University, Faculty of Business

The Michael G. DeGroote School of Business invites applications for a tenure-track position at the Assistant/Associate Professor level, commencing Fall 2001. Preference will be given to candidates with teaching interest in auditing, EDP auditing, E-commerce, information systems and/or advanced financial accounting.

The candidate's Ph.D. should be completed by the commencement of the appointment, preferably with demonstrated high quality teaching and research. Duties include research (McMaster is a "research intensive university") and teaching at the both the graduate and undergraduate levels. Salary will be commensurate with academic qualifications, teaching and practical experience.

Applications which should contain a CV and names of at least three references, should be mailed to:

Dr. V.V. Baba, Dean
Michael G. DeGroote School of Business
McMaster University
Hamilton, ON L8S 4M4
E-mail: baba@mcmaster.ca
Fax: (905) 526-0852

McMaster University is committed to employment equality and encourages applications from all qualified candidates including: aboriginal peoples, persons with disabilities, members of visible minorities and women. Canadian citizens and permanent residents will be considered first for this position.

Applications will be considered until the position is filled.

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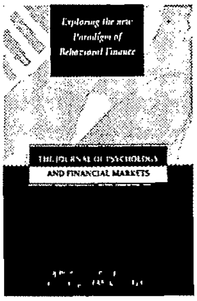
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